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ABSTRACT

This document is one of a series of studies that surveyed recruits to teaching drawn from nontraditional pools, such as retirees, homemakers, career switchers, and recent college graduates with mathematics and science degrees. The preparation programs for these prospective teachers are "nontraditional" in that they are designed specifically to prepare candidates who did not engage in undergraduate teacher preparation programs. The document gives detailed case studies of 10 of these nontraditonal programs. The emphasis is on the structure of the programs, the reasons for their initiation, the recruitment pools toward which they are targeted, and program requirements. (JD)

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ED309136

A RAND NOTE

Recruiting Mathematics and Science Teachers Through Nontraditional Programs: Case Studies

Lisa Hudson, Sheila Nataraj Kirby, Neil B. Carey, Brian S. Mittman, Barnett Berry

August 1988

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PREFACE

This Note is one of a series of three RAND documents presenting the results of an 18 month study sponsored by The Ford Foundation. The study surveyed recruits to teaching drawn from nontraditional pools, such as retirees, homemakers, career switchers, and recent college graduates with mathematics and science degrees; the study also examined the programs that prepare these recruits to become mathematics and science teachers. The preparation programs are "nontraditional" in that they are specifically designed to prepare candidates who did not engage in undergraduate teacher preparation programs. For purposes of this study, the definition of "nontraditional" includes teachers certified in fields other than mathematics and science seeking retraining as mathematics or science teachers. The preparation of this and the companion documents was supported in part by RAND's Center for the Study of the Teaching Profession.

The first document in the series, *Recruiting Mathematics and Science Teachers through Nontraditional Programs: A Survey*, N-2736-FF/CSTP, presents an overview of nontraditional mathematics and science teacher preparation programs in place across the country. It details program characteristics, with particular emphasis on recruitment, program requirements, and conditions that seem important in ensuring program viability.

The present document, the second in the series, gives detailed case studies of a small sample of these nontraditional programs. The emphasis here is on the structure of the programs, the reasons for their initiation, the recruitment pools toward which they are targeted, and program requirements.

The third report in the series, *New Recruits to Science and Mathematics Teaching: The Role of Nontraditional Teacher Preparation Programs*, R-3661-FF/CSTP, focuses on the motivations, program and labor market experiences, and perceptions of the individuals who enter these selected programs. Ultimately, the data presented in these three papers

should help predict how successful nontraditional programs will be in alleviating teacher shortages in mathematics and science, and how such programs can best be designed and targetted toward potential teachers.

This Note should be of interest to audiences at both the national and state level who are interested in the broad issues of teacher education and supply and demand. It should also be of interest to administrators of teacher education programs and other policymakers interested in implementing similar nontraditional programs.

ACKNOWLEDGMENTS

We are indebted to our project officer, Barbara Scott-Nelson of The Ford Foundation, for her support and interest. We are particularly grateful for the cooperation and generous time given by the administrators of the selected programs. These individuals are: Henry Bindel, Jr. (George Mason University), Mary Louise Ortenzo and Jay Shotel (George Washington University), Teddy McDavid and Delia Stafford (Houston Independent School District), Linda Calderon (Los Angeles County Office of Education), Sheila Cassidy (Educational Development Network, Inc.), William Smith (University of North Carolina at Chapel Hill), William Halpern and Patricia Wentz (University of West Florida), Patricia Graham and Steven K. Million (Winthrop College), Rose Marie Smith (Texas Woman's University), Richard Clark, John Fischetti, and Klaus Schultz (University of Massachusetts at Amherst), and Perry Phillips (West Virginia University).

We thank our reviewers, Audrey Champagne of the American Association for the Advancement of Science and Arthur Wise of The RAND Corporation, for their thoughtful and constructive comments on an earlier draft.

We are especially grateful to Luetta Pope and Linda Tanner for their excellent typing and their inexhaustible patience, and to Patricia Bedrosian for her skillful editing.

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Case Study 1

GEORGE MASON UNIVERSITY: ALTERNATIVE SCIENCE TEACHER PROGRAM ("SWITCHER" PROGRAM)

Interviewers: Sheila Nataraj Kirby
Lisa Hudson

Contact Person: Henry Bindel
George Mason University
Fairfax, Virginia

The Switcher Program is a full-time, one-semester (16-week) program designed for individuals with prior academic training and work experience in earth science, chemistry, or physics. The program includes only these areas because these are areas of teacher shortage in Northern Virginia. Dr. Bindel began the program as one means of alleviating shortages and of improving the quality of science teachers in the area. The program was not modelled on any other existing programs.

Dr. Bindel receives about five to seven calls a day from people interested in participating in the program and has been approached by about six other organizations interested in imitating or implementing his program. He has discussed the Switcher Program at numerous educational conferences.

GMU also has another nontraditional program for training science teachers. This is a fifth-year program for subject-area B.A.s that does not have the strict work-experience requirement of the Switcher Program. Dr. Bindel usually refers interested callers who cannot meet the qualifications for the Switcher Program to this fifth-year program.

PROGRAM DESCRIPTION

Enrollment

The program began on paper in April 1985. During the Fall semester 1985, the advisory board and the curriculum committee were established. Criteria were then established for clinical faculty (the master teachers in the Fairfax County, Arlington County, and Alexandria City Public

Schools) and for associate faculty (the candidates). There were over 150 inquiries for the Spring 1986 semester.

In Spring 1986 they accepted 17 applicants, and eight actually attended. In Fall 1986 the figures were 26 and seven, respectively, and in Spring 1987 (the current participant pool), 34 were accepted and 10 are participating. For the Fall of 1987, they anticipate an enrollment of 12 to 15--they already have about 70 inquiries from qualified individuals (over 200 inquiries overall). The low ratio of acceptances to participants is attributed to individuals often deciding that they cannot afford to go four months without a paycheck while they are enrolled in the program (even though the program does not cost them anything).

The current class consists of one participant in physics, four in chemistry, and five in earth science. They are all being prepared for teaching grades 8-12. (Grade 7 is not included because the Virginia curriculum requires life science at that grade.) In accord with Virginia state requirements, graduates leave the program with provisional certification--after two years of teaching they are eligible for full certification. Candidates are also told, before entering the program, what other (content area) courses they will need to become certified; one participant, for example, needed to take an American history class, and another (a chemistry major) needed physical chemistry. They fulfill these extra requirements on their own--the program provides them only with pedagogical training. The certificate graduates receive is valid in Virginia, Washington, D.C., and 39 other states. The nine credit hours of coursework participants take may also be applied toward a master's degree.

Program Requirements

Participants complete nine semester hours of coursework, followed by six semester hours of student teaching. The courses are (1) Essential Elements of Secondary Education; (2) Psychological Foundations of Adolescent Learning and Development; and (3) Workshop in Education--Secondary Science Methods. The courses are team-taught by three GMU education professors, including Dr. Bindel. Each course meets

for two hours and fifty minutes twice a week for eight weeks, and each has a field experience component consisting of 15 hours of classroom observation. All courses meet at Woodson High School--the idea is to make participants fully aware of the high school environment as early as possible. As part of the observational field experience requirement, each participant is also required to attend at least one science fair.

The practicum occupies the second eight weeks of the program. This student teaching is done at one of the three participating local school districts--Fairfax, Arlington, or Alexandria. The participating teachers ("clinical faculty") are carefully selected and must meet the following requirements: five years' teaching experience, master's degree, demonstrated expertise in subject area and teaching strategies, and recommendation from a science supervisor. (Each of the three participating school districts has one science supervisor.) Each clinical faculty member is paid $500.

The clinical faculty are selected by program staff, with input from participants. Each participant is given a list of clinical faculty members in his/her subject area and can observe those teachers during the observational field experience. Participants and teachers then select those with whom they would most prefer working, and program staff consider these choices when making their final placement recommendations.

During the first week or two of the practicum, participants only observe; after that, they take over one course at a time, until they have taken over their mentor teacher's full course load. Then they ease back out, so that by the end of the eight weeks the regular teacher is again teaching all courses. At the end of four weeks, the participants go through a practice review with their clinical faculty members; at the end of eight weeks, they receive an official review (from the clinical faculty member). Participants' student teaching is also observed by Dr. Bindel and by the participating school's assistant principal.

There are no exceptions to these course and field experience requirements.

Recruitment and Admissions

Before initiating the program, Dr. Bindel conducted background research on the potential supply of qualified "switchers"; he discovered that scientific and technical industries abound in the Northern Virginia area.[1] To reach qualified individuals in these companies, the program uses a variety of recruitment strategies, including sending informational brochures to businesses, radio and newspaper advertisements, and television interviews. The program has received some local media attention, which has provided a source of free advertising. Radio ads appear to be the most effective recruitment method. Thanks to effective advertising and the large local supply pool, the program has had no trouble finding qualified candidates.

Because of funding arrangements in the original (three-year) program proposal, the program is designed to enroll 12 participants each semester. The three main admissions criteria are a bachelor's (or higher) degree in earth science, chemistry, or physics, three years' work experience, and at least a 2.75 grade point average (GPA) in the last two undergraduate years. Dr. Bindel screens interested people using these criteria; those meeting the criteria must (1) submit a formal application, including three letters of reference and a personal letter of intent; (2) pass the computer literacy proficiency examination and the general knowledge, communications skills, and relevant specialty area sections of the National Teacher Examinations (NTE) (these are state requirements); and (3) undergo an interview with the interview committee (the three program instructors, a science supervisor, and a clinical faculty member). Ultimately, each candidate's likelihood of being successful is judged by the interview committee.

---

[1] In 1983-84, there were over 500 research and technical manufacturing companies in Fairfax County alone. Of the more than 41,000 people employed in these firms, over 3,000 served in the biological, chemical, and environmental areas. In addition, the Washington, D.C., area houses many government defense-related organizations, which employ engineers and technicians.

Participants

Program participants typically range in age from the mid-20s to the mid-50s; the first class had a mean age of 39, ranging from 27 to 55. The current participants range in age from 25 to 57. The current class is 50 percent female; overall, the total group composition has been just under 50 percent female. Apart from one Asian and one black participant, all other participants have been white. Only three black candidates have ever applied for the program, suggesting that minority recruitment has been a problem. In the current class of 10, six have bachelor's degrees, two have master's degrees, and two have doctorates. Eight are mid-career transfers and two are retirees from the federal government.

Graduates

The program had eight graduates in its Spring 1986 class (the full class), and six in its Fall 1986 class (one dropped out because of illness). Everyone in the current class is expected to graduate at the end of this semester. Of the 14 graduates, two have not gone into teaching, and three are still making up coursework or doing extra student teaching, so that nine of the 14 are currently teaching--but four of the five nonteachers are expected to eventually teach.

Graduates find out about job opportunities from Dr. Bindel; the schools always have more openings than he has graduates to fill them. Dr. Bindel is well-known and well-respected in the area, so schools are always glad to accept one of his graduates. Program participants have thus had no trouble finding jobs or being accepted into the schools that hire them. The graduates do go to local schools (usually in one of the three participating districts), so that they work in suburban high schools and junior high schools with students from a wide range of socioeconomic backgrounds. There is no formal follow-up of graduates, although the staff occasionally does meet with them informally.

Affiliation and Funding

The program is funded primarily by a three-year grant from the Education Department's Office of Educational Research and Improvement (OERI); the three-year budget is $108,650. In addition, the Virginia Department of Education provides a $1,000 forgivable loan to all in-state participants. This money covers tuition ($840), books ($100), and parking fees at GMU ($40) and is forgiven if graduates teach in Virginia for one semester. Currently, eight of the 10 participants are Virginia residents and thus have received the forgivable loan.

FUTURE PLANS

The three-year grant ends in the Spring of 1988. Reaction to the program has been so positive that they anticipate no problems being refunded. In fact, Dr. Bindel hopes to expand the program to include more participants. Another improvement he would like to make is to reduce the administrative burden by making the program more independent from the university bureaucracy. He feels the program's special strength is the amount of time and attention given to each participant.

Dr. Bindel conducts an annual in-house assessment of the program and modifies the curriculum using the results of that assessment. In his first assessment, for example, he found that participants felt overwhelmed by educational jargon and that they preferred a highly structured instructional approach. Modifications were made accordingly. Also, after the eight weeks of course work, participants felt competent in classroom climate, content and methods, teaching styles, and lesson planning. Their main concerns with respect to teaching were student attitudes, administrative support, equipment and materials, and "negative home environments." On the positive side, the participants reported being pleased with the respect and affection of students and colleagues and the new perspective teaching gave them in their daily lives.

Case Study 2

GEORGE WASHINGTON UNIVERSITY: THE MIDCAREER MATH AND SCIENCE MASTER OF ARTS IN EDUCATION

Interviewers: Lisa Hudson
Sheila Nataraj Kirby

Contact Persons: Mary Louise Ortenzo, Director
Jay Shotel, Assistant Dean
George Washington University
Washington, D.C.

The Midcareer Math and Science Program (MSMA) is an academic program of study designed for individuals with prior undergraduate or graduate training in mathematics or science who want to become secondary school teachers. The program was initiated by Dr. Shotel, Assistant Dean of the School of Education and Human Development, who felt there was a shortage of mathematics and science teachers in the Washington metropolitan area. In particular, some local districts complained of having exhausted both the applicant and substitute teacher pools for mathematics and science; others admitted having a substantially smaller pool. Dr. Shotel also felt that the metropolitan area was particularly favorable to the initiation of such programs, as it is characterized by a large pool of military retirees (most of whom are in their mid-40s and looking for second careers), as well as government retirees and employees who might well be enticed into a career change. Because of its focus on this pool of "impending" retirees, the program is designed to be taken part-time; efforts are made to accommodate participants' time constraints through the scheduling of courses and the use of schools which operate in the early morning hours and on Saturdays for the required classroom observation component. Also, participants do not go through the program as a cohort: Dr. Shotel and Ms. Ortenzo feel that this is a bit problematic, since they would like the participants to have a group identity, share ideas and experiences, etc.

The program was modelled to some extent on Harvard's Master of Arts in Teaching (MAT) program, although there are substantial differences, particularly in the course requirements and the emphasis on fieldwork as an important corollary to academic training. The program is undergoing some changes, the major one being to make it portable so it can be offered off-campus at Fort Belvoir, a large local Army base. This is a result of former Secretary of Defense Caspar Weinberger's and Secretary of Education William Bennett's recent push for using military retirees as teachers, and from expressed interest in the program by military personnel at Fort Belvoir. Another change is the inception of a second nontraditional program at George Washington University, the "Teaching Residency Program for Liberal Arts Graduates," a one-year teacher preparation program for recent B.A.s. This latter program will not be limited to mathematics and science.

Johns Hopkins has a similar mid-career teacher preparation program, which was developed after investigating the GWU program. Ms. Ortenzo noted, however, that it is not accurate to say that the Johns Hopkins program is a "copy" of their program, any more than it is accurate to say that the GWU program is a "copy" of Harvard's--in both cases, the later-developing programs used the existing programs only loosely as models.

PROGRAM DESCRIPTION

Enrollment

The program began in Fall 1985. They received 125 requests for information and approximately 25 applications. Ten individuals were accepted but two required additional content coursework, so eight people initially participated in the program. Since then five were accepted in Spring 1986, three in the Summer of 1986, seven in Fall 1986, two in Spring 1987, and another three were expected to join in the Summer of 1987. The applicant-to-acceptance ratio is approximately 2 to 1, and about 80-90 percent of those accepted enroll in the program. Currently, the program has 22 active participants. The program is limited to mathematics and science, with participants split 50-50 between these two

broad areas, and two certifying in both areas. The program prepares teachers for grade levels 7 to 12. Participants currently receive a Master of Arts in Education at the end of the program, unless they choose to remain only until they meet certification standards, then teach without the advanced degree. (The certificate is transferable to over 30 states, including Virginia, Washington, D.C., and Maryland.) Participants are allowed to enter the program, complete certification requirements, and continue as part-time students in the master's degree program while teaching. The master's program is designed to take two years to complete part-time (six credit hours per semester) or full-time in three semesters (12 credit hours per semester). Two participants have finished the program in one year as full-time students; the remainder are part-time students.

Program Requirements

Degree candidates must complete a total of 36 credit hours, all of which are education or elective courses. *No* courses are given in the subject areas, although participants may be counselled to take some as refresher courses or to remedy a "deficiency." Certification-only candidates must complete 18-21 credit hours of work (18 is the minimum; they may take more to meet certification standards for neighboring states). The required education courses for certification are:

- Psychology for Learning and Teaching (this has a large fieldwork component where participants are expected to observe in real classroom settings) (three credits)
- Adolescent Development or Social Foundations of Education (three credits)
- Secondary School Principles and Methods (three credits)
- Teaching Mathematics/Science in Secondary Schools (one or other topic area) (three credits)
- Student teaching (six credits)

The additional courses for the master's degree (electives for others) are:

- Analysis of Teaching (three credits)
- Reading Instruction in Content Areas (three credits)
- Computers in the Classroom (three credits)
- Mainstreaming (Special Education) (three credits)
- Recent Developments in Mathematics or Science (three credits)
- Quantitative Methods (three credits)

Some of the elective courses are offered to allow participants to meet certification requirements in states bordering Washington, D.C., (e.g., mainstreaming is required in Maryland). There are currently no exceptions to these program requirements, but the university appears willing to substitute or transfer credits from similar courses.

The required field experience is an important and heavily emphasized component of the program. In accord with district clock-hour requirements, participants have 10 weeks of student teaching under the joint supervision of a cooperating master teacher (who is paid a nominal stipend of $100), and a university faculty member (currently Ms. Ortenzo, head of the program). The student teacher assumes full responsibility for teaching after an initial period (typically two weeks) of observation. Participants can request particular placements on the basis of their observations during the methods course fieldwork component, or the university will arrange placements through the Office of Laboratory Experience. The placement can be anywhere in the Washington, D.C., metropolitian area and in a wide range of public and private schools. Generally, participants are not paid during this placement, unless some special provision is made (e.g., they are hired as a substitute teacher or recruited as a full-time teacher, as has happened in three cases). During the internship, there are a minimum of four meetings held with the student teacher, cooperating teacher, and university supervisor. The cooperating teacher provides the final grade.

Recruitment and Admissions

The program is directed toward mid-career transfers, in particular, military people approaching retirement who may be considering second careers. Recruitment for the program is fairly low-key, consisting mainly of articles or advertisements in military newspapers and mailings to various industries and businesses. The advertisements have been the most successful in generating interest in the program. Word-of-mouth also seems to have become a means of attracting candidates, although only to a small extent. Although it has not been difficult to find qualified candidates for the program at its current size, both Ms. Ortenzo and Dr. Shotel said the program could comfortably accommodate slightly larger numbers if they could find even more candidates. They feel a need to increase their recruitment activities.

Program applicants must be accepted into the GWU graduate school. (The GPA and test score requirements below reflect graduate school admissions criteria.) The criteria for selection are:

- An undergraduate degree from an accredited institution.
- A minimum 2.75 undergraduate GPA.
- A specialization in mathematics, i.e., 24 to 30 semester hours in mathematics, or
- A specialization in one of the sciences, i.e., 24 to 30 semester hours in physics, chemistry, earth science or biology, or a combination of science courses equaling 30 hours.
- A score above the 50th percentile on the Miller Analogies Test or Graduate Record Exam.
- A personal interview.

Of these, the interview is generally regarded as being the most important criterion determining the applicant's admission to the program. During the interview, candidates who do not seem suited for teaching are "counselled out" of the program. This counselling replaces the rejection of applicants. The first course, Psychology of Learning and Teaching, has a large fieldwork component, which provides

participants with the additional knowledge they need to make an informed choice about teaching--i.e., it gives them the chance to elect out of the program before they have made large investments of time and money. Two participants have done this.

Participants

About 76 percent of the current active participants are male. They range in age from 28 to 58, with most between 35 and 50 years of age. Well over four-fifths are white; half come from military backgrounds, the remaining coming from accounting, university teaching, and homemaking. About a fifth have doctorates. The program does not actively recruit minorities, but there is an expressed desire to enroll more minority candidates--they have so far been unable to locate as many qualified minority candidates as they would like.

Graduates

The program is relatively recent, but it has two graduates--one who obtained a master's degree and one who completed certification requirements. Another two are expected to take their comprehensive examinations fairly soon (the exams are a GWU graduate school requirement). Participants have been heavily recruited by a number of school districts and have been able to be fairly selective about where they wish to teach. Currently, they are teaching in suburban high schools serving large school districts with a student population of mixed socioeconomic status. Although military people have traditionally had problems being accepted by schools, these program participants have been welcomed and actively recruited both because of high demand in the local area and because of the program's careful screening and its emphasis on fieldwork and development courses. The program plans to have both formal and informal follow-ups of graduates, although no procedures for doing so are as yet in place.

Affiliation and Funding

The program is lodged in the university's School of Education and Human Development. The program has no separate budget and is subsumed under the overall School of Education budget. Although the program itself does not offer financial aid, participants in the military are eligible for Veterans Administration benefits. In addition, Washington, D.C., contributed funds this year for tuition assistance for individuals who would teach in the District. Three or four participants have taken advantage of this tuition assistance. The 1987-88 program tuition was $300 per credit hour, making the full cost of 36 credit hours $10,800. The program has been limited in size for two reasons: (1) a desire to maintain personal contact with and support for participants, and (2) a lack of qualified applicants (for a much larger program). Administrators mentioned that the program could accommodate 30 participants with the addition of a new faculty member.

FUTURE PLANS

The experience of the past two courses has led the faculty to change the curriculum in some respects. For example, a new survey refresher course is being added as a noncredit offering. They feel this is especially necessary in mathematics, where teachers need to understand where their particular courses fit into the entire school mathematics curriculum. They are also considering adding a series of round table discussions between participants and classroom teachers to give participants a clearer picture of the realities of being a teacher and of the school curriculum, and to increase their opportunities to meet with each other. The program is to be evaluated in 1988 when it is due for re-accreditation. Individual courses are evaluated each time they are taught.

The major strengths of the program are its individualized nature, the population on which it draws, and its fieldwork and field placement. Lack of money (operating on a "shoestring") appeared to be the major concern.

Case Study 3

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL: THE LYNDHURST FELLOWSHIP PROGRAM

Interviewer: Sheila Nataraj Kirby

Contact Person: William W. Smith, Director
University of North Carolina
Chapel Hill, North Carolina

The Lyndhurst Fellowship Program is a fifth-year, MAT program for arts and science baccalaureates interested in teaching mathematics, science, English, or (to a lesser extent) social studies. The program was started by the Chancellor of the University of North Carolina. Chancellor Fordham approached the Lyndhurst Foundation and broached the idea of starting an experimental program that would have two main goals: (1) attract highly talented people who have already completed a college degree (outside of education) into mathematics, science, and English teaching, and (2) experiment with the curriculum to see if the number of education courses could be reduced, without jeopardizing the ability of program participants to become teachers. The program was initially funded for three years in 1982 (phase I), and received its second funding in 1985 (phase II). The second goal has been given higher priority in the second phase of the program. The program is not modelled on another teacher preparation program, although Dr. Smith pointed out that it is not very different from the old fifth-year MAT programs that developed in the 1950s; however, this program's focus on arts and science undergraduates makes it more similar to the fifth-year programs advocated by the Holmes Group.[1]

When the program was started, there were severe shortages in the mathematics and science subject areas in North Carolina; these shortages

[1]The Holmes Group is a consortium of research universities with teacher education programs. It is dedicated to the improvement of teacher education and the teaching profession, following the reforms laid out in *Tomorrow's Teachers: A Report of The Holmes Group*, The Holmes Group, East Lansing, Michigan, 1986.

continue to exist. The program has had some "minimal" effect in alleviating shortages but, overall, "the program is too small, the problem too big."

Program administrators initially received calls from a number of other institutions interested in the program. The Lyndhurst Program at the University of Tennessee is to some extent modelled after them, although it is quite different in nature, particularly since the Tennessee Program does not lead to a degree and does not have a fellowship component.

PROGRAM DESCRIPTION

Enrollment

The program began on July 1, 1982. The table below lists the program's annual enrollment:

Number of	1982-1983 Starting Year	1985-1986 Last Year	1986-1987 Current Year	1987-1988 Anticipated
Applicants	30	50	45	44
Acceptances	23	16	18	18
Participants	22	13	18	15-18

Primarily for budgetary reasons, the program originally had an enrollment limit of 24; the limit has since been lowered to 18. The decision to become smaller was based on a desire to increase the stipend level and to allow for more innovation with the practicum component of the program.

The program prepares teachers for grade levels 9-12 (earlier, this was grades 7-12 but North Carolina State certification rules changed). Currently, they have participants certifying in the following subject areas: mathematics (seven participants), biology (four participants), chemistry (one participant), and English and social studies (six participants). There are currently no candidates preparing for physics. The Fellows (as the participants are called) receive an MAT and a "G"

level certificate on successful completion of the program. (North Carolina issues two types of certificates to beginning teachers, based on education: "A" for those with a bachelor's degree and "G" for those with a master's degree.)

Program Requirements

The program takes exactly one year to complete: two academic semesters and two summer sessions, from July 1 to June 30. All participants attend full-time. Program requirements are:

Summer (July-early August)

- Investigations and Trends in the Teaching of English, social studies, science, or mathematics (three credit hours).
- Psychology of Childhood and Adolescence (three credit hours).

Fall-Spring (August-May)

- Content coursework (18 credit hours): Three courses are taken each semester, for a total of six courses in the content area.
- Seminar on Issues in Education (two credit hours): This seminar meets throughout both semesters.
- Pedagogy (five credit hours): This experimental course covers basic learning theories, testing, and strategies for effective teaching. The course meets throughout both semesters.
- Practicum (three credit hours): This consists of a supervised practicum in a local school under the direction of the supervising (mentor) teacher.

Summer (May-June)

- Social Foundations of American education (three credit hours).
- Elective: any three-semester-hour graduate level course (with permission of the advisor).

Total Coursework

Content area	18 hours
Education	16 hours
Practicum	3 hours
Elective	3 hours
Total	40 hours

Transfer credits can be obtained for a maximum of two courses. These decisions are made by the School of Education. Education course exemptions are practically nonexistent. Indeed, too many education courses may well lead to rejection of the applicant.

Each Fellow has an advisory committee consisting of an education faculty member, a faculty member from his/her content area, and a high school mentor teacher. Committee members are paid $3,000, $1,500, and $3,000, respectively.

All Fellows participate in a two-semester practicum (August-May), which requires a practicum experience of at least five hours each week, under the direction of the mentor teacher and an education faculty member. Participating schools are located in Chapel Hill or Durham.

In the first phase of the program, the practicum was somewhat disorganized and not very useful or successful. To correct this problem, Dr. Smith now hires mentor teachers in each subject area and assigns up to four Fellows to each teacher. The teachers are occasionally given extra funds to hire colleagues to assist them. The education faculty member periodically visits the classroom, although Dr. Smith felt this varied somewhat. No formal evaluation is done, although Dr. Smith receives feedback on an informal and periodic basis during meetings with the faculty and mentor teachers. He has also asked that faculty members and mentor teachers give him a written statement regarding the participant's practicum experience. This tends to be more a letter of recommendation than an evaluation.

Recruitment and Admission

The program is directed toward individuals with a bachelor's degree in mathematics, science, English, or social studies, or those with equivalent coursework in the content area in which they desire certification, regardless of their major. Other than having a strong academic background (see below), the most stringent criterion appears to be that applicants have no (or very few) of the professional education courses required for certification.

The program used to recruit through mailings to universities, Peace Corps newsletters, professional association newsletters, presentations at conferences, etc. In the last two years, because of the large response, there has been no direct advertisement. Mailings to relevant university departments were the best recruitment method. Although they have no difficulty locating qualified candidates in general, there are differences in how easy it is to recruit in the different subject areas. From most to least difficult, Dr. Smith listed: physics, mathematics, chemistry, biological science, English, and social studies.

Program applicants are required to apply to the Graduate School of Education for admission into the regular MAT program. For those with no teaching experience, these requirements are a minimum 3.3 GPA and 1150 GRE score. Once admitted to the graduate school, candidates become eligible for the Lyndhurst fellowships. At this point, the records of all candidates are examined by a subcommittee consisting of three individuals from the relevant subject area--an Arts and Sciences faculty member, a School of Education faculty member, and a mentor teacher. Transcripts, letters of recommendation, and personal statements are examined to determine the strength of the individual's background. Admissions recommendations are then submitted to the program director and the Associate Dean of the School of Education. Recommended candidates are generally accepted, although occasionally a particular decision is questioned and discussed. An interview is not required; however, 50 percent of the Fellows do come for an interview at their own initiative. Candidates are encouraged (although not required) to send a letter explaining why they are applying and how they came to their decision to become a teacher.

The program tries to keep roughly even numbers of participants in each subject area (with the exception of social studies, which is a smaller part of the program, and typically has very few participants), but they do not lower standards to do so. If, for example, they plan on admitting four biology candidates, but five outstanding candidates are available, they will take these five candidates over less outstanding candidates in other areas.

Participants

The current Fellows are all white; in previous years, they have had only three black participants. Fellows range in age from 20 to 32 years, with most falling between 22 and 26 years. Generally, the participants have been fairly evenly divided between men and women; the current group is overwhelmingly female (two men among the 12 in math/science). They have a 3.4 average undergraduate GPA; one out of the 14 now remaining in the program has a master's degree. Participants are predominantly either recent B.A.s, graduate students changing their area of study, or people making early career changes. In the current group, one participant was a private school teacher. The background characteristics of participants have not changed noticeably over the years.

Program Graduates

The program requires participants to teach for three years after graduation or repay the stipend. They have had about 75 percent compliance and are now starting to track those not teaching. Of the current group, 18 started the program, but four dropped out. Of the last class of 14, 13 graduated, and 10 accepted teaching positions. There are no obvious patterns as to who is likely to be more successful in completing the program; Dr. Smith did note that all of the participants tend to be more mature than the typical undergraduate, so that maturity is usually not a factor.

Because of the experimental nature of the program, there tended to be some resistance to hiring graduates in the early years. Now, however, school districts repeatedly recruit Lyndhurst Fellows. Graduates accept jobs in a variety of schools. There has been some feedback that the new teachers find their schools very different from the schools in which they did their practicum: Apparently, the schools around UNC are, not surprisingly, somewhat atypical schools with highly motivated students.

The Director holds a reunion for program alumni in the summer. This allows him to get feedback informally. In April 1988, Dr. Kinard White, Professor of Education, is conducting a telephone survey of program graduates, to collect data on their satisfaction with teaching as a career, their problems, plans, etc. He feels the key question regarding the program is: How good are the Fellows as teachers? Dr. Smith phrases the question as: Given the difference in education coursework between the Fellows and traditional MATs, do the Fellows perform any differently in the classroom?

The Lyndhurst Foundation does not itself conduct formal program evaluations, although Dr. Smith sends them regular reports. A formal evaluation, of which this study may represent a component, will be sent to the Foundation at the conclusion of this program.

Affiliation and Funding

The program is part of the graduate school at UNC, combining resources from both the School of Education and the College of Arts and Sciences. (Although participants are officially School of Education students, the program director, Dr. Smith, is from the College of Arts and Sciences; student committees include a faculty member from each school.) The program is approved by the North Carolina Department of Instruction as an experimental program. The department has been very supportive.

Last year's program budget was $212,000; this year, the budget was $215,000. About 85 percent of the total budget is provided by the Lyndhurst Foundation, with the remaining 15 percent provided by the university. About 75 percent of the total budget is appropriated for student aid--all participants receive a $7,500 stipend, plus paid tuition. Tuition is $1,300 for in-state students and $7,000 for out-of-state students (this covers the full 40 credit hours, or one year). Last year, $26,500 (of the budget) went to tuition; this year, the amount is $31,000.

FUTURE PLANS

The program is due to end in June 1988. There is a formal evaluation planned, with Dr. White's graduate survey to be used in the final report. They are also requiring (and paying for) graduates to take the NTE; they will be tracking these graduates. (Under North Carolina rules, the Fellows are typically exempt from taking the NTE because their GRE scores are so high.)

The College of Arts and Sciences will be maintaining a Lyndhurst program; however, this will be a competitive grant program for program graduates. The grants will provide money for their anticipated 60-70 teaching alumni to use for travel, study, and so on. Meanwhile, the School of Education is changing its regular MAT program to make it more similar to the current Lyndhurst program.

Dr. Smith feels that the program has succeeded in fulfilling its two goals. It clearly has attracted bright candidates. Also, as an experimental program, it has provided a good demonstration of an alternative preparation program that reduces the amount of required education coursework. Drs. Smith and White felt that a further reduction in education coursework with a corresponding increase in the practicum would prove beneficial. They felt that one of the weaknesses of the program was the insufficiency of clinical experience (although it has vastly improved since the first phase). They believe that interest and knowledge alone are not sufficient; a more systematic internship is needed to fully prepare participants for teaching.

Case Study 4

UNIVERSITY OF MASSACHUSETTS AT AMHERST: MATH/ENGLISH/SCIENCE/TECHNOLOGY EDUCATION PROGRAM (MESTEP)

Interviewer: Lisa Hudson

Contact Persons: Richard Clark, Director
John Fischetti
Klaus Schultz
University of Massachusetts
Amherst, Massachusetts

MESTEP is a 15-month program of academic coursework and teaching and industry internships, designed to train recent baccalaureate students with degrees in mathematics, science, or English for middle or secondary school teaching. The program was designed in 1982-83, in response to the expressed recruitment concerns of school superintendents, and to national reports such as the National Academy of Sciences' *Education for the 21st Century*. The program had three goals: (1) alleviate shortages; (2) bring relatively young and diverse people into teaching (because of fiscal cutbacks, Massachusetts has an aging teaching force); and (3) investigate the use of computers and other new technologies in teaching. Program administrators have also become concerned with investigating ways of keeping good teachers in the classroom, by providing them with more interesting and varied teaching career options.

Faculty from the UM School of Education initially approached school districts in eastern Massachusetts (the university is in the more rural western part of the state), and found six school districts willing to participate in the program. The faculty and superintendents then approached local industries, and obtained two-year support for up to 24 annual internships from Digital Equipment Corporation. The program has since expanded to include 50-60 school systems (most, but not all, in the suburban Boston area) and about 12 companies, including Data General Corporation, Hewlett-Packard, New England Telephone, IBM, General Motors, the Bank of Boston, Barry Wright Corporation, Houghton Mifflin, Prime Computer, Millipore, and Spinnaker Software.

The program has been receiving pressure, mainly from the participating industries, to increase its enrollments. Program planners have been unwilling to do this, however, because they feel that small cohorts work best, and because they do not want to train more people than the local school systems actually need. Currently, shortages in Massachusetts are "spotty," being confined mainly to the growing suburbs around Boston.[1] Shortages are expected to become more severe, however, with the greatest need arising in the early 1990s.

One enrollment change that has been made since the program's inception is the inclusion of a small number of English subject-area participants--the program was initially designed only for mathematics and science teacher training.

The program was not modelled on any other pre-existing programs. Arizona has implemented a program similar to the MESTEP, and New Jersey and the University of Warwick (England) have expressed an interest in starting similar programs.

PROGRAM DESCRIPTION

Enrollment

Since the program began in 1983, they have had about 100 applicants each year, and have accepted 19-25 participants annually. In the first year, they accepted 19, in the second year 24, and in the third year 12; this year they have 22 participants, and in 1988-89 they expect to have about 24. They are resisting expanding their enrollment so that they can remain highly selective, keep a workable cohort size, and ensure that they do not "overproduce" prospective teachers. Their applicant-to-acceptance ratio used to be about 80 percent but has since dropped to about 60 percent. They attribute this drop to a growth in other opportunities for applicants.

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[1]In the recent past, the state's teacher supply and demand situation was greatly affected by "2-1/2," tax reform legislation similar to California's Proposition 13. In 1981, when the legislation was passed, the teaching staff was cut by 15 percent; many 20- to 30-year-old teachers left the teaching force, and little hiring has been done since then.

They have had roughly the same type of participants over the years--about twice as many females as males, with about half of the participants coming directly from college (the others have been out for two or more years). The program makes a conscious effort to obtain an ethnically diverse student body; administrators feel they have become increasingly successful in this effort--for this year and next, they have achieved their goal of 25 percent minority representation. Also, last year they began accepting candidates for teaching English--they had one such participant last year, three this year, and expect four next year. The remaining 19 current participants are divided fairly evenly between mathematics and the sciences (general science, biology, chemistry, and physics). They attempt to enroll at least 10 participants in mathematics each year. All participants prepare for grades 9-12, except for general science teachers, who become certified in grades 5-9 (although program graduates never teach below grade 7).

The program is highly structured and full-time only. Participants go through the program in cohort groups, which both participants and staff feel is an important part of the learning experience.

Program Requirements

Program participants take 51 credits (including internships) to receive a master's degree in education and certification in one subject area.

The program is intensive. Participants spend the month of June in Amherst, where they take three courses plus micro-teaching; at the end of June they relocate to eastern Massachusetts for the remaining 14 months. In July and August participants student teach, then they have a one-semester teaching internship and one-semester industry internship during the school year, while taking two evening courses and a monthly seminar. Finally, participants take four courses during the second summer. The first summer's courses include teaching methods in the relevant subject area and a planning and assessment course. Participants also take a course that introduces them to the "work of the high school teacher." This is a experiential course. For the first

assignment (given before the first day of class), participants go to a local school and observe for a day, following teachers around to see what they do; on the first day of class, participants discuss what they saw. These courses tend to be less distinctly separable than most college courses, as the overlap and continuity of the courses are greatly emphasized.

During the first summer's student teaching, participants are closely supervised and evaluated. All student teaching is done at the Acton-Boxborough Regional Summer School in Acton, Massachusetts. Teams of four interns are assigned to a mentor teacher. The mornings are devoted to teaching, but in the afternoon, the interns have daily sessions with the mentor teacher and also observe and evaluate each other. All student teachers receive a final three-way evaluation from the university supervisor, school representative (usually the department head), and the student teacher. In rare cases (about one per year), interns are rated as unsatisfactory and are then counselled out of the program.

When the internships begin in September, half of the participants become industry interns and the other half become teaching interns; at the end of the semester (in January), they switch places, so that a pair of interns fills one full-year teaching slot. The teaching internship gives participants full responsibility for a class, although a support teacher is assigned to each intern, to observe the intern for a certain number of hours each week and to help spot and correct any problems the intern might be having. The support teacher is nominated by the host school and is paid by the program for his/her services. Intern support is also provided by the university supervisor (sometimes the same person as the summer mentor), who also conducts in-class observations and provides assistance and evaluative feedback. Interns receive regular salaries of about $9,000 per semester from the school (or industry) during their internships.

Teacher interns have state approval to teach *as interns*--they are not fully certified (they have had most of the necessary coursework at this point, and about half the required student teaching), but they are legally employable in Massachusetts as teacher interns.

Most industry internships involve education-related work. This can be collecting data on an industry's training courses, field-testing computer training modules, developing staff training curricula, teaching adults, etc. Program graduates have the option of continuing these internships for three years during the summer months.

Participants take two evening courses during the school year: (1) a course on computers and society, given by industry personnel; and (2) an adolescent psychology course. They also take a monthly seminar which allows participants to reflect and compare experiences. The final summer consists of courses in (1) language and communication; (2) evaluating and using software; (3) cultural diversity in the schools; and (4) introduction to research (in a specific discipline). (The fourth course used to be programming, but was switched to research, which program planners felt was more relevant.) In addition, during the second summer, "old" participants serve as "consultants" to the new group of participants. All courses during the school year and second summer are held at Acton High School, or at Digital--only the first four weeks of (summer) courses are held at the university.

Recruitment and Admissions

The program is designed for recent mathematics, engineering, science, or English baccalaureates; people with less recent degrees are also acceptable, if they have done "significant recent work"--although this has not yet been an issue, they want to be sure that participants are current in their field. Aside from this requirement, the UM Graduate School (into which participants must also be accepted) requires a 2.75 or higher GPA. Although there is no minimum cutoff for GREs, program participants' mean GRE scores are in the 75th to 90th percentiles.

Applicants who meet these basic requirements and "whose applications seem otherwise compelling" come to Digital for a one-day meeting, during which they have four interviews with school district personnel and four with industry personnel. The sessions serve primarily as part of the recruitment process, and secondarily as a

selection device. Feedback from these interviews is used to make final selection decisions--of prime importance are school and industry personnels' ratings of whether they believe each candidate is truly committed to and appropriate for teaching.

The program actively recruits in about 20 states. They originally recruited only along the East Coast but have since expanded recruitment activities to include other states with many colleges and universities. The major recruitment activity is an annual mass mailing of brochures and posters (with tear-off application requests) to colleges' department heads and placement offices. This involves a total of over 2,000 mailings, and yields 70-75 percent of all inquiries. They also recruit informally through presentations and discussions at relevant professional meetings and by word-of-mouth.

The program also has an intensive minority recruitment campaign. This involves a number of different recruitment strategies: (1) including minority institutions with mathematics and/or science programs in their mailing list; (2) networking with individuals at minority institutions, or with individuals who have connections to minority students; (3) taking advantage of minority recruitment strategies and efforts in the participating corporations (Digital has an especially strong minority recruitment campaign); and (4) personally following up on every minority candidate who inquires about the program. Each of these efforts appears to be useful, with networking recently beginning to show noticeable results. They feel that the personal attention given to minority candidates has been particularly effective.

They have not had trouble locating qualified applicants, but the recent drop in the acceptance ratio leads them to believe that the competition for these people is increasing.[2] As a result, they are planning to intensify recruitment activities within Massachusetts. The focus on Massachusetts is due to the high concentration of higher education institutions in the state, and because people recruited in

[2]This is occurring in two areas--students appear to have more choices for graduate teacher preparation programs and for other academic or corporate positions. They view the latter as the tougher competition.

Massachusetts have a higher probability of remaining in-state to teach.

They believe that it is necessary to "hustle" for the best candidates, to let them know that teaching is not just an option but one of the best options they can choose. They feel their program has been successful in making teaching appealing to bright subject-area majors.

Participants

The current participants are all in their early- to mid-20s--about 60 percent are recent college graduates, 20 percent have been out of college one year, and the remaining 20 percent have been out two or three years. The mathematics and science participants are about evenly divided between males and females, and six participants are minority members. (Next year's class will have five minority members.) One or two participants in each class have, or are obtaining, a subject-area master's degree; most have only a bachelor's degree. About two or three of this year's class had an industry job before entering the program. Dr. Clark believes there might be a trend for the more recent participants to be a bit older and more experienced, having both more teaching and work experience.

Graduates

The program is currently admitting its fifth class; it has about 57 graduates overall, with 16 graduating in last year's class. Over 80 percent of all graduates have gone into teaching, with about 70-75 percent remaining in teaching for at least three years. (Participants agree to teach for three years when they enter the program.) A few have taken industry jobs instead. If and when participants drop out, it is usually at the end of the first summer, just before the internships, and just after student teaching.

Typically, intern slots are filled by graduating interns (so that the program inevitably has to find new intern positions each year). All interns find teaching positions, but they all must "work at it." The number of offers participants receive varies, with mathematics and physics teachers and minority teachers having more choices. Dr. Schultz noted that although the program looks small in absolute numbers, it

provides most of Massachusetts' new hires in the mathematics and science areas. Thus, they do have a significant impact on the teacher supply in Massachusetts.

About half of the interns work in urban schools, with the rest divided between suburban and rural schools. Districts usually need more of their graduates than they can supply; graduates are highly valued and desired in all the schools they go to. About half of the graduates keep working at their industry internships during the summer months.

Program administrators have not only been tracking their graduates but have also begun collecting and analyzing an extensive set of interview transcripts describing graduates' life histories, experiences in the program, teaching experiences since graduating, and so on. One thing they have learned from this follow-up is that the graduates tend to feel lonely and isolated. (In most schools, these graduates are the only new, young teachers.) To alleviate this problem, the program is initiating an alumni support network; individuals from this year's class have agreed to serve as coordinators for the network.

Affiliation and Funding

The program receives strong support throughout the university, and has been funded every year by the School of Education Dean's office, the university President's office and the university Chancellor's office. The Massachusetts High Technology Council and, to a lesser extent, the Boston Private Industry Council have brought participating industries into the program. The 50-60 participating school systems are recruited through a joint effort of program staff and the initially participating school districts.

The program's funding sources have varied. In the first year, the program ran only on funds from the School of Education, the university President's office, and the Chancellor's office. They were then funded for one year by the Bay State Skills Corporation, out of the Office of Economic Development (this group typically provides funding for private sector job training programs). Finally, they received three years of decreasing funding from the U.S. Education Department's Fund for the Improvement of Secondary Education (FIPSE). A smaller amount of funding

is also provided by the Massachusetts Board of Regents. Currently, FIPSE provides $83,000; with other (state) sources providing an additional $17,000. Tuition is $4,000 per student (about $1,000 per semester), which generates another $100,000. If internship payments are also counted, another $200,000 is generated from the industry internships (about $9,000 per student) and another $200,000 from the teaching internship. Because participants receive salaries during the internships, they do not qualify for student aid. Most or all participants use student loans to cover program costs.

FUTURE PLANS

From data they have collected on both program graduates and participants, they know a great deal about their program's strengths and weaknesses. They have found that the features that attract students to this program are that they can: (1) teach quickly; (2) work in a close-knit cohort; (3) remain connected to industry; (4) do work that is socially important; and (5) earn a salary while in the program. From the staff's point of view, the program's biggest strength is the success of its recruiting efforts--the program has high-quality participants, with whom everyone is impressed. (One of their graduates was just voted "outstanding teacher" in the Lawrence School District.) They also feel that the cohorts are a plus, helping to "strengthen and energize" each participant. The partnership with industry and local schools is also highly valued, as all three groups work together to set program direction and policy and to instruct and evaluate participants. Finally, they feel that they have developed a useful "compromise model"--one that does not provide either too much or too little pedagogical training and that demonstrates how summer school and experienced teachers can be used as viable teacher training resources.

On the other hand, the program is very intense, putting a great deal of time pressure on participants. It also is complicated to have participants interning in eastern Massachusetts when the program staff are at the university. They hope to obtain more secure funding, possibly by becoming more institutionalized, and to improve sections of the program dealing with integrating technology into the classroom. As

mentioned above, they also want to improve their connections with program graduates to ensure that these people remain in teaching by fully using support networks and industry employment options. They are also interested in finding out how the "broader culture" provided by industry internships affects teachers' attitudes and practices. In general, they feel they are implementing many of the Carnegie Report recommendations (e.g., use of master teachers, industry component to keep teaching interesting), and plan to keep using recommendations for professionalizing teaching in their program revisions.[3] For example, they are trying to place their interns in "Carnegie schools" (i.e., schools dedicated to staff training and development); they would like such schools to annually reserve a certain number of slots for program interns.

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[3]See Carnegie Forum on Education and the Economy, Task Force on Teaching as a Profession, *A Nation Prepared: Teachers for the 21st Century*, New York: Carnegie Forum, 1986.

Case Study 5

WEST VIRGINIA UNIVERSITY: POST-B.A. TEACHER CERTIFICATION PROGRAM

Interviewer: Lisa Hudson

Contact Person: Perry Phillips, Program Director
West Virginia University
Morgantown, West Virginia

The WVU program provides a master's degree in education and full certification to individuals with a content-area degree in English, foreign languages, mathematics, or science (biology, physics, general science), among other areas. The WVU College of Education began the program in 1973 as an "alternate" certification route. The program was begun for two reasons: (1) There were teacher shortages in West Virginia, and (2) WVU had a supply of interested and available teacher candidates, in the form of faculty spouses and other university-affiliated personnel.

The WVU program is not modelled on any other program; instead, it adapts the WVU undergraduate program for the graduate level, within the bounds set by state certification regulations. In 1973, the state allowed the substitution of graduate-level courses for the required undergraduate courses, thus allowing a post-B.A. program to become more feasible. Since that time state regulations have altered further to allow even greater flexibility, but the program still remains tightly coupled to the undergraduate program. One of the most significant policy changes affecting the program was the State Board of Education's "5100" system, which was one part of the state's response to the 1982 Recht court order on "thorough and efficient" education.[1] The 5100

[1]This court case (*Pauley v. Bailey*) resulted from a suit filed by parents of students in Lincoln County, West Virginia, who claimed that, because of unequal funding, their children were not receiving as good an education as other students in the state. Judge Recht's decision (termed "one of the most incredible decisions on education ever handed down by a court" by *Education USA*) not only ordered the state to equalize funding, but also specified in great detail what a "thorough and efficient" education for all students in the state should be. The

system was instituted in 1985 and made the following changes: It required (1) a pre-professional skills test to be passed by all applicants to teacher education programs; (2) content-area tests, to be passed by all education graduates before certification; and (3) performance assessments of field practicums, in the relevant content area(s) and grade level at which the individual will be teaching. It also increased flexibility in teacher education programs when admitting candidates--for example, this past December, a candidate for the post-B.A. program with a Ph.D. in biology was able to be admitted without undergoing a time-consuming and tedious transcript search and course match--procedures that would have been unavoidable before 5100. The performance assessments are also a new development that the program is still adapting to, having conducted its first such assessments this past December.

As WVU is a Holmes Group member, a major revision in both the undergraduate and graduate teacher training programs is planned, using the Holmes Group's proposed redesign. (These are discussed in more detail below, under "Future Plans.")

West Virginia currently does not have a statewide teacher shortage, but Dr. Phillips noted that teacher shortages are still an issue. As more of the master plan is implemented, the demand for well-trained mathematics and science teachers will increase, as more teachers will be needed for teaching advanced mathematics and science courses. The WVU post-B.A. students would fill this niche perfectly.

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state responded with a three-phase master plan, to be gradually implemented over the next few years. When fully implemented, the plan will increase students' opportunity to study mathematics, science, and language arts, including a full range of advanced studies in these areas. Thus, full implementation of the master plan will result in increased demand for mathematics and science teachers in West Virginia. Unfortunately, continuing economic problems in the state have slowed implementation of the plan; it is unclear when funding will be available for full implementation. (For a discussion of the ruling, and resulting implementation problems, see *Education USA*, Vol. 29, No. 37, May 11, 1987.)

PROGRAM DESCRIPTION

Enrollment

In the early years, when requirements were more rigid, thereby making graduate teacher training more time-consuming, the program was much smaller than currently, enrolling only 5-6 participants per year until about 1981-82. Enrollment went up in the early 1980s to about 15 per year. For the past two years, they have had about 30 applicants per year (although the number of applicants tends to fluctuate quite a bit), and about 25 new participants per year. They currently have 59 participants (not including their special education program participants)--with two in mathematics, two in general science, three in biology, one in chemistry, one in physics, and the rest in other subject areas. About 75 percent of all applicants are accepted each year. About 60 percent of the participants attend the program full-time--since it takes one academic year plus two summers to complete the program full-time, the 59 current participants include individuals who began the program in at least the last two years. They anticipate enrolling an additional 30 participants next year. Although they do not want to increase the overall size of the program until they have completed their redesign, the proportion of mathematics and science participants has been increasing in recent years, and they anticipate that this may continue in the future.

In theory, participants can prepare to teach grades K-8 (general elementary), 5-8, 5-12, or 9-12. Most participants are preparing for the latter two grade spans, with most future mathematic teachers preparing for grades 5-12, and most future science teachers preparing for grades 9-12.

Last year, 18 participants were recommended for certification (i.e., graduated). One of these was in biology, three in general science, and three in mathematics.

Program Requirements

Participants who enter the program with only a bachelor's degree obtain a master's degree in education and full certification upon completion of the program--those with more advanced degrees may obtain the M.Ed. or take courses on a nondegree basis, and receive only the teaching certificate. To accommodate both full-time and part-time participants, courses are offered in the evenings as well as during the day, and on a full summer schedule. Participants must take 27 hours of education coursework, including one semester of student teaching. Master's degree participants take an extra nine credit hours in their content area, for a total of 36 credit hours. The graduate pedagogical courses are designed to be analogous to the undergraduate courses. The graduate courses are: (1) secondary curriculum (three credits); (2) educational psychology (either of two three-credit courses offered on this topic, depending on the participant's background); (3) teaching methods, including teaching strategies and educational foundations (six credits); (4) content-specific teaching methods (three credits); and (5) reading in the content area (a state requirement, three credits). Exceptions to these course requirements are made for participants who have previously taken the requisite courses. Pre-practicum clinical experiences are structured into the courses. These experiences include videotaping of teaching simulations and classroom activities in neighborhood schools.

In addition, participants complete one semester of student teaching, for 15 credit hours (nine of which can be applied for the graduate degree). Participants are not paid for student teaching, but the cooperating district teachers do receive payment (or tuition waivers) from the university. To evaluate participants during their practicum, all faculty in the program have had clinical supervision training. In addition, evaluation handbooks have been developed, based on state objectives for student-teacher assessment, for use by university faculty, student teachers, and cooperating teachers. At the end of the practicum, the student teachers undergo a three-way evaluation by their university supervisor, cooperating teacher, and

themselves (i.e., self-evaluation). Experience has shown that these students tend to be more reflective than the typical undergraduate and are usually their own most critical evaluators.

The field experience is arranged through the university, by program faculty familiar with both the participants and cooperating teachers, and by the college placement office. Participants are placed within a 50-60 mile radius of the WVU campus. No special provisions are made for part-time participants; they must also complete a full semester of student teaching.

After completion of all course requirements, participants must pass the state's content test in the specialty area before being recommended for certification; the individuals in this program, because of their strong subject-area background, have no trouble with this test.

Recruitment and Admissions

The program is designed for individuals with a strong subject-area background in a teaching field and with strong interest in teaching. Recruitment for the program is basically word-of-mouth--University Arts and Sciences faculty are aware of the program (the Education and Arts and Sciences faculty have traditionally worked together in developing state educational curricula) and are happy to recommend that their students attend the program if they have an interest in teaching. Most program participants are thus recent WVU graduates, graduate students, or others who are somehow associated with the university (e.g., lab technicians). The program is also listed as a degree option in university brochures, but word-of-mouth seems to be the predominant means of attracting candidates. Using only this strategy, the program has had no difficulty attracting qualified candidates.

To be admitted into the program, an individual must have a minimum 3.0 GPA, relevant subject-area degree, at least 1,000 on the GRE (combined), and a demonstrated interest in teaching. Applicants must also pass the state preprofessional skills test (a basic skills test) before acceptance; those with an M.A. or Ph.D. are exempt from this requirement. All applicants are interviewed; interested individuals lacking the prerequisite course background may be counselled out of applying or to take the relevant courses before applying.

The first two courses are the most crucial in terms of determining whether a candidate will succeed in the program--the dropout rate is highest during these courses, and it is during these courses that faculty members can best evaluate participants' attitudes and expectations about teaching.

Participants

The participants are roughly evenly divided between sexes (this is true within the mathematics/science areas as well as across all areas) and are ethnically diverse (largely because of the ethnic diversity at WVU). About two-thirds have B.A.s; one-third have an M.A. or above. Most participants come directly from undergraduate or graduate programs, the rest come from industry. The proportion coming from industry is higher in mathematics and science (about 20 percent), with local chemical industries serving as a large supply source.

In the past few years--especially in the last three or four years--the quality of the participants has appeared to improve, both with respect to their academic qualifications and their commitment to teaching. Dr. Phillips listed a number of possible causes for this increase: (1) The College of Education has increased its standards in the past few years; (2) all students at WVU have apparently been improving academically, so that their major supply source has been improving; and (3) the West Virginia economy has been declining, so that bright people have had fewer job options--Dr. Phillips felt that this was especially true in science fields, as West Virginia scientific industries have been undergoing especially hard times.

Graduates

The program has had about 150 graduates since 1973, most in areas outside mathematics and science. Over 80 percent of all graduates take teaching positions, although recently two participants preparing for science teaching took industry jobs instead. Dr. Phillips believes that participants who are older or have had more contact with the public schools tend to be more successful in completing the program. To

minimize the "culture shock" of entering the classroom, some participants are given a more gradual introduction to the "average" classroom by beginning their clinical experience in advanced classes, then moving to more typical classes.

Graduates do not have a difficult time obtaining a teaching position, unless they want to stay in the local area, where there is a surplus of teachers. Those willing to relocate, however, have many options both within and outside the state, as other states' districts (e.g., Montgomery County, Maryland; Houston, Texas; Florida) recruit heavily at WVU (from both the undergraduate and graduate teacher education programs). Graduates of the post-B.A. program have no difficulty locating a position or adjusting to their positions because of their status as "alternative" recruits.

A formal follow-up of graduates is not currently conducted, although there are plans to conduct one in the future, as part of the redesign effort.

Affiliation and Funding

The program is part of WVU's College of Education and works both with local and state education agencies to ensure that the program meets state certification requirements and meets local districts' needs. As part of the College of Education, the program does not have a separate line-item budget. University funding is currently very tight, so that the program does not have as much funding as it would like; Dr. Phillips is working to obtain outside funding (grants) for the post-B.A. program. He is optimistic about the prospects for obtaining such funds.

For the last three semesters, participants have been eligible for need-based tuition waivers--about seven participants received a waiver this semester. The only other available source of financial aid is student loans, available through the university's financial aid office. Tuition for the program is $630 for in-state residents and $1,670 for out-of-state residents. (The tuition covers 9-15 credit hours, or one full-time semester.)

FUTURE PLANS

Over the past three years, the post-B.A. program, along with all other College of Education programs at WVU, has undergone a series of evaluations and reviews. Many changes were made at the undergraduate level, and are now being implemented at the graduate level, based on the Holmes Group recommendations. More changes are planned for the near future, also based predominantly on the Holmes Group's recommendations and on the research literature related to these recommendations.

Some of the changes they plan to make are:

- Setting up the program for full-time students only--they would like to have distinct cohort groups;
- Having an intern year for new teachers and professional development schools to provide the intern experiences (an idea from the Holmes Report);
- Cutting back the amount of student teaching, in accord with the induction year concept, but creating more structured clinical experiences and improving assessment procedures (the "5100" system has increased the flexibility the university has in determining teachers' qualifications, making assessment a more crucial issue);
- Using "modules" rather than semester courses;
- Conducting follow-ups and case studies of program graduates; and
- Possibly increasing recruitment activities, once the redesign is complete.

Dr. Phillips listed the major strengths of the program as: the quality of the participants, the faculty's personal interest in participants, the basic structure of the program, and the strong field practicum support that participants receive. He felt that the major weakness was that the program is not yet as well-defined as he would like, i.e., it does not yet revolve around the current findings of the Holmes Group (and other recent research literature).

Case Study 6

HOUSTON INDEPENDENT SCHOOL DISTRICT: HOUSTON ALTERNATIVE CERTIFICATION PROGRAM

Interviewer: Neil B. Carey

Contact Persons: Delia Stafford, Program Administrator
Teddy McDavid, Staff Development
Houston Independent School District
Houston, Texas

The Houston Alternative Certification Program (ACP) was designed to address a teacher shortage in the Houston School District, attract well-qualified candidates to teaching. and contribute to the district's capacity to train its own teachers. The program is not based on any other existing programs. It allows participants to fulfill state credential requirements by serving a one-year internship under the supervision of an experienced certified teacher and by receiving teaching method and classroom management classes. It was developed by the Texas Education Agency and initiated by the former superintendent Dr. Billy Reagan, who wanted to help fill the 2,200-2,600 yearly district teacher vacancies. Partly because of the decreasing number of teacher education graduates, the district was facing large shortages of elementary, ESL, and bilingual education teachers. Secondary English, mathematics, and science fields were also problem areas, although to a lesser extent. The program provides an incentive for college graduates to enter teaching by giving them an opportunity to enter the classroom quickly and receive a reasonable salary (approximately $19,000) while being fully prepared.

Several groups have expressed interest in using this program as a model. For example, the National Commission on Alternative Certification and the American Association of Colleges for Teacher Education have requested more information about the program. Houston's was the first alternative certification program (ACP) in the state, and there are now eight across Texas. The commission is likely to recommend the Houston model for imitation across the country.

The program has changed emphasis since its first three cycles (which started in September, October, and January). The first three cycles, which began during the program's first year, included participants seeking both elementary and secondary credentials. The fourth and fifth cycles have included only those seeking elementary credentials. This change was made for many reasons. First, the district's greatest needs were at the elementary level. Second, during the first year, the district made successful efforts to increase the number of mathematics and science teachers by allowing applicants qualified for middle school teaching to move to high school positions--they then went through the files of elementary teachers and found those who had potential to teach middle school mathematics and science and promoted them. The remaining secondary vacancies could then be filled through regular channels. Finally, it was too expensive to offer training in so many different subject matter areas.

Other major changes include increases in the credit hours required for completion of the program, having universities provide the training for the second half of the school year and allowing principals to select the interns for their vacancies. (In the first year, principals were required to accept an intern for their vacancies.) The district also decided to institute a cooperative training program with local universities and to use district staff for other activities.

PROGRAM DESCRIPTION

Enrollment

The program began in Fall 1985-86. In the first year they received 6,000 requests for applications. Approximately 350 applicants were accepted; of these, 155 were recommended to the state, and 51 are still completing requirements, for a total of approximately 206 participants for the first year. Of these, 14 participants received certificates in mathematics and 31 in science. In the second year, they did less extensive advertising. Instead, they relied heavily on the files of those who applied for the first year as the basis for choosing applicants. There were 78 participants in the second year. None of

these participants were in mathematics or science because they now only accept those seeking elementary credentials. They have done a larger amount of advertising for the present (1987-88) year. They expect about 1,500-2,000 applicants for next year and are hoping to enroll approximately 100. The only limit to the size of the program is the number of interns that principals choose to fill their vacancies.

Program Requirements

For the first year of the program, credential candidates participated in a preassignment orientation in August, in which they received 40 hours of training in lesson planning, classroom management, and learning characteristics. In addition, they observed in a classroom for a full week. After completing this orientation, each candidate was reviewed to determine if she/he should continue in the program. Participants were counselled to leave if they did not seem to like teaching or appeared unprepared to deal with the pressure of training. At this point, some participants decided for themselves that they did not wish to continue. Individuals offered a contract were given full-time teaching responsibilities if available, and received about 100 hours of an individualized training program. The training was given every Monday night from 4:00 to 8:00. The modules, which were developed by district personnel, focused on classroom management and other general areas of teaching. The training was supplemented through mediated instruction such as videotapes and audiotape recordings. The only content instruction given was immediately before the end of training, to provide refresher work for the EXCET test given to all teacher training graduates. In addition, interns took 30 hours of workshops on classroom management and teaching methods during the following summer. There were no exceptions to these program requirements.

The field experience included the 25 hours of observation and the one-year internship. Those who did not receive full-time assignments were assigned as substitutes. Some interns acquired additional experience by tutoring after school or serving as teacher assistants. Each intern was matched with a supervising teacher who had achieved a certain level on the district career ladder (achieved through seniority

and favorable evaluations). The supervising teacher generally had a master's degree, 135 hours of in-service training, or nine hours beyond the bachelor's degree. The supervising teacher worked closely with the intern, often having a classroom next door. Interns also observed supervising teachers' lessons. Supervising teachers evaluated the interns once a month. Additional assistance was provided by the principal, department or grade level chairperson, and program staff. Interns also could seek assistance from other experienced teachers and administrators.

Recruitment and Admissions

The program is directed toward (1) business or industry professionals who want to change careers, (2) retirees, and (3) homemakers. The program's focus has changed, since it now seeks only those interested in elementary and bilingual teaching. The program uses full-page newspaper advertisements, television and radio advertisements, and flyers to recruit. Program managers also recruit through informal personal contacts in businesses, civic groups, and churches. Their recruitment strategy has not changed significantly since the program began, although they now use less advertising. They found that the newspaper ads were the most effective recruitment medium. They have not had trouble attracting qualified applicants, but the program would be larger if principals accepted more interns to their schools.

The criteria for selection are based on Texas Education Agency guidelines. Mathematics and science candidates were required to have a bachelor's degree, a 2.5 GPA in their subject area, and 24 credit hours in the mathematics or science subject area. During the first year, they had so many highly qualified applicants that the lowest GPA of anyone accepted was about 2.8. Beyond these minimum requirements, all candidates must pass either the Pre-Professional Skills Test or the Functional Academic Skills Test. Secondary mathematics and science candidates take a subject-area test to pinpoint areas of weakness that should be remedied. The candidate's interpersonal fitness is assessed in part from a general interview and from Selection Research Inc.'s (SRI's) "Teacher Perceiver Interview." One program administrator felt

that the structured interview is the best single predictor of whether an applicant will be successful in the program.

Participants

Of the first year's 45 mathematics and science participants, 22 were female. Of all 278 program participants, 61 percent are white, 28 percent are black, 10 percent are Hispanic, and 1 percent Asian. The program has actively recruited Hispanic applicants.

Graduates

No information was immediately available on the numbers completing the program, although Adelman[1] reports a 39 percent attrition rate for the first program year. Program administrators felt that it is difficult to predict who is going to be successful, although previous teaching experience and doing well on the SRI interview appear to be good signs. Of the approximately 350 entering the program the first year, 206 graduated. Of these, 155 have received their credential and 51 are holdovers who still are working to receive their credential. The program administrators' impression was that most graduates continue teaching at the schools to which they are initially assigned, which include a high proportion of inner-city schools. They know of no cases where program graduates had trouble getting jobs, although a few may have taken jobs in neighboring districts. Better information on these questions should be available in 1988--the research department conducted a study of program graduates during 1987.

Affiliation and Funding

The program began as an independent district enterprise, with the school district providing all program funding. The program is now more closely aligned with local colleges and universities because of the extra course requirements that have been instituted. For example, all elementary teachers must take six hours in reading instruction. The

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[1]N. E. Adelman, *An Exploratory Study of Teacher Alternative Certification and Retraining Programs*, Policy Studies Associates, Washington, D.C., 1986.

program's first year budget was $552,365. The second year's budget is approximately $455,000 although not all of that money will be used, since the program now has fewer participants. The budget may decrease to around $260,000 for next year. These decreases are the result of having fewer program participants. Participants are paid for their work at full beginning teacher salary levels if they obtain a position as teacher of record (as opposed to a substitute position). During the first year of the program, participants were paid to attend the training sessions but not for classroom observation. During the second year, participants are asked to pay for books and university tuition. The district continues to pay for the district portion of training. Stipends were lowered from the first year of the program to the second year, partially because program administrators felt that participants have more commitment to a program in which they must "invest."

FUTURE PLANS

The major changes in the program appear to have occurred after the first year. These changes resulted from the new focus of the program on elementary and bilingual teaching, as well as new state requirements for more coursework. In the future, they hope to have a larger number of candidates and more cooperation from principals. The district is considering whether district-specific certification is desirable, given that it makes a large investment in the training of participants who currently can seek employment in surrounding districts.

The program's special strength appears to be its ability to attract people who want to teach and who are strong in mathematics and science. The program meets state requirements, and according to a report from the research department, the participants performed as well or better than university-trained first-year teachers on standardized tests of teaching proficiency.

Case Study 7

WINTHROP COLLEGE: SOUTH CAROLINA CRITICAL NEEDS CERTIFICATION PROGRAM

Interviewer: Barnett Berry

Contact Persons: Steven K. Million
Patricia Graham
Winthrop College
Rock Hill, South Carolina

In 1984, South Carolina's Educational Improvement Act established the Critical Needs Certification Program (CNCP) to alleviate teacher shortages in critical areas. Using state supply and demand figures, the State Board of Education initially designated mathematics and science as the critical areas. In 1985, library science was added to the list. During 1984-85, a committee comprising representatives from public schools, higher education, and the State Department of Education officials met to design a program for the conditional certification of teachers. The program was adopted in May 1985 and Winthrop College was selected to coordinate it.

The legislation allows college graduates with degrees in mathematics, science, or library science to begin teaching without the normally required education courses or student teaching practicum. Instead, it provides an accelerated program of study to prepare individuals who have academic credentials, but no pedagogical training in the three identified subject areas. Since program participants must have already obtained a teaching position in the given subject area, CNCP activities occur the summers before and after the first year of teaching and in one-day-a-month seminars. Participants receive regular teacher salaries while enrolled in the program. The CNCP is not modelled on any other existing program.

CNCP participants begin their training with a preservice two-week institute the summer before they are to begin teaching. During the first year of teaching, participants attend eight monthly seminars, where they work with specialists to solve problems encountered on the

job. They are observed and evaluated in their classrooms by program staff and local mentors. Following the first year of teaching, those candidates judged to have made satisfactory progress, and who have been offered a new teaching contract, receive additional training in a second two-week training institute. Participants also are required to complete nine hours of prescribed graduate study during their three-year conditional period. This period commences with the issuance of the conditional teaching certificate at the completion of the first two-week institute.

The program has received considerable attention from not only organizations interested in alternative teacher certification programs (e.g., the Southern Regional Education Board) but also from organizations interested in improving teacher education in general. For example, administrators believe that because of the program's emphasis on teaching effectiveness as its organizational core, CNCP "may have value in the redesign of future teacher training programs."

PROGRAM DESCRIPTION

Enrollment

The CNCP began in July 1985. Since then, 192 individuals have entered the program in the three critical subject areas--secondary mathematics, science, and library science.

An individual may enter the program either in the Summer (July-August) or in the Winter (January). The program's first cycle was initiated with 15 participants (14 remained with the program). Since that time, 177 additional persons have entered the program.

Currently, there are 142 active participants. Sixty-one are teaching mathematics, 79 are teaching science, and two are in library science. It is anticipated that approximately 60-65 individuals will enter the program in 1987-88. There is no limit on the size of the program.

Program Requirements

The CNCP curriculum has been developed from teaching effectiveness research and is closely linked to on-the-job training, although supervised by college faculty and local district personnel.

Eligibility requirements for the CNCP include possession of a bachelor's degree in a certification area experiencing critical teacher shortages (as determined by the State Board of Education). In addition, candidates must pass the appropriate specialty section of the National Teacher Examinations. After satisfying these initial requirements, the candidate is issued a letter of eligibility by the State Department of Education. Using the letter of eligibility, the candidate can then seek employment with a public school district in South Carolina. However, before candidates can begin teaching, they must demonstrate satisfactory progress in the preservice, two-week institute.

As previously noted, the program has three distinct phases. First, participants begin the program with an intense two-week institute. The intensity of this initial training is viewed positively by administrators, as it helps participants form mutually supportive cohort groups. The experience is compared to that of a medical internship, which is also intensive, and provides a rich experience for learning and networking. During this time, candidates are taught the pedagogical principles and the methodological skills believed to be the most critical to effective teaching. Using this information, participants plan and deliver a series of peer lessons. These lessons are carefully evaluated by selected experienced public school teachers and program staff. Participants are also exposed to a number of professional issues including classroom management, adolescent psychology, school law, parent-teacher relations, and techniques of student evaluation. It is not uncommon for institute study to last 14 or 15 hours per day.

During the course of the academic year, participants attend eight monthly seminars. The staff brings together consulting experts who speak on a wide range of topics, including "assertive discipline," classroom management techniques, motivation of students, characteristics of middle school and high school learners, writing in the content areas,

promotion of higher-level thinking skills, student team learning, and the teaching of low achievers. Among those consulting in this program have been Dr. Elaine Maimon (Brown University), Dr. Kenneth Henson (University of Alabama), Dr. Jeremy Kilpatrick (University of Georgia), Dr. Julia Thomason (Appalachian State University), Dr. Thomas McDaniel (Converse College), Dr. Jeanne Pfeifer (Sacramento State University), and some 40 others.

During the initial year of teaching, participants must satisfy the demands of three Assessments of Performance in Teaching (APT), as do all other beginning teachers in South Carolina. Although the APT is intended to allow for the careful scrutiny of beginning teachers, several program participants have passed this statewide assessment but failed the program's regular evaluation process. In addition, participants must pass all subtests of the South Carolina Educational Entrance Examination. At the end of this first phase, participants who meet all program requirements earn three hours of undergraduate credit from Winthrop College.

Participants enter the next phase of the program by beginning a second two-week summer institute at Winthrop College. This institute provides the opportunity for participants to undertake more in-depth study of teaching effectiveness and a host of related professional concepts. During this second intensive period, additional consultants go beyond the role of presenters by demonstrating, in a workshop setting, the application of the principles they promote.

Program administrators have noted that despite the inclusive nature of the curriculum used in the second two-week institute, the major focus remains fixed on enhancing teaching effectiveness. Peer teachings are continued but are soon followed by assignments to summer school teaching responsibilities in local public schools. Again, highly competent public school personnel and program staff observe and evaluate their teaching experiences. Evaluators critique all aspects of the presentation and work with candidates in remedying weaknesses.

Program staff continue to observe participants during their second year of teaching. Under new regulations, which began in July 1987, participants are supervised by an in-school mentor and a college-based

field coordinator whose job is to visit the participants in their schools, observe their teaching, and offer suggestions for improvement when necessary.

When the staff determine that candidates are teaching effectively and have satisfied all requirements of the second two-week institute, including the on-site visits, candidates are granted six hours of graduate credit from Winthrop College in courses appropriate to their area of certification. Upon successfully completing a second year of teaching (and signing another contract), candidates may move on to the final CNCP phase.

In this final phase, candidates must complete three additional graduate courses within three years of the issuance of their first annual conditional certificate. Candidates may select any accredited college or university, but the courses must be in prescribed areas. These areas are: human growth and development, reading in the content area, and education of the exceptional child. Upon completion of the nine hours of graduate credit, participants receive a regular five-year professional South Carolina teaching certificate for grades 7-12.

Recruitment and Admissions

The Critical Needs Certification Program is directed toward mid-career transfers, retirees, and recent graduates with bachelor's degrees in mathematics, science, and library science. The program has attracted recruits by using newspaper and radio advertisements, advertisements in professional journals, State Department of Education publications, local school district publications, and the South Carolina Center for Teacher Recruitment. (The center is a state-sponsored agency housed at Winthrop College to coordinate several programs designed to attract qualified individuals to teaching.) Program officials have noted no difficulty in attracting highly qualified individuals. College professors, engineers, accountants, and others have joined the program.

Presently, admissions and retention criteria are set by the State Board of Education. In effect, passing the NTE and performing well during the first two-week institute are the initial screening tools available to program officials.[1]

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[1]Officials hope to initiate more stringent criteria in the future. More specifically, they would like to improve the admissions criteria

CNCP staff report that because of the challenging standards and the uncommonly high accountability measures established by the CNCP staff, approximately 26 percent of the initial participants are no longer teaching in South Carolina. Some of these participants left voluntarily (to return to industry or to relocate), and others have been "deselected" by the program staff.

Participants

There are 142 active participants (50 have left the program). Of those persons active in the program, administrators have noted the following demographic characteristics:

Gender and Race

Female	88
Male	54
Minority	22

Certification Area

Mathematics	61 (66% female)
Science	79 (61% female)
Library Science	2 (50% female)

Educational Background

Bachelor's degree	142
Master's degree	32
Doctoral degree	7

Age Ranges

23-27	62	38-42	17
28-32	26	43-47	9
33-37	20	48-52	6
		53+	2

Program Graduates

Program officials are in the process of designing a major study of CNCP to better ascertain the program's effect. Administrators of the program believe that CNCP's greatest strength is its participants. They are "well versed in their subject areas ... bring a wealth of experience to public school teaching ... are mature ... and are less likely to leave teaching than would be persons with less experience and maturity."

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regarding "pedagogical" ability; they feel that the academic standards are more than adequate but that the use of these standards alone is insufficient. The addition of an interview, letter of intent, etc., would aid program administrators in determining who will make a knowledgeable and *effective* teacher.

Program officials believe that those who are successful in the program (1) know their subject matter well and (2) are open to being taught how to teach. Some participants enter the program with an "arts and science mentality" believing that "little in a school of education is worth learning." However, extensive interviews with participants indicate that "such views are quickly replaced with a broad appreciation of the methodological and curricular content of this program."

In general, program participants face the same problems as do other new teachers. Some complain that they do not receive enough assistance from their schools; others complain they are being "smothered" by local administrators. Some have personality problems with local administrators; still others may have some difficulty managing classroom paperwork or student discipline.

The participants teach in a wide range of the state's school districts. Although many are in the urban and suburban school districts of the state, a considerable number have chosen to teach in the rural areas. In fact, a former partner in an engineering firm who decided he wanted a mid-career change and the challenge of teaching chose to enter one of the state's most isolated school districts.

Affiliation and Funding

The program is designed to involve higher education, the State Department of Education (SDE), and local school districts. Although the program is administered from Winthrop College, the SDE and the local districts play significant roles in implementation. For example, the SDE sets admissions and retention criteria. In 1985-86 the budget was $180,000. In 1986-87 the budget was approximately $230,000. The allocated monies go toward administration and staffing as well as books, consultants, housing, tuition, and food (for seminars and institutes). The only cost to participants is the nine hours of required graduate coursework. This cost varies from college to college.

FUTURE PLANS

The first cycle is now complete. Future plans call for greater numbers of field coordinators to better serve the expanding population of participants. There are also plans to offer formal training to local school mentors. Other plans include longitudinal studies of the efficiency of the CNCP training procedure and more vigorous recruitment of qualified minorities.

Case Study 8

LOS ANGELES COUNTY OFFICE OF EDUCATION: MATHEMATICS AND SCIENCE TEACHER RETRAINING PROGRAM (MSTRP)

Interviewers: Brian S. Mittman
Neil B. Carey

Contact Persons: Linda Calderon, Consultant
Teacher Education and Computer Center
Los Angeles County Office of Education
Los Angeles, CA
Sheila Cassidy, President
Educational Development Network, Inc.
San Pedro, CA

Contact persons for individual sites:

Contact Person: Judy Kasabian, Site Coordinator
El Camino Community College

Contact Person: Fritz Smith, Site Coordinator
Whittier College

Contact Person: Tom McGuire, Site Coordinator
University of La Verne

Contact Person: William Ritz, Site Coordinator
Cal State University, Long Beach

Contact Person: Ray Glienna, Site Coordinator
Glendale Community College

The Los Angeles County Mathematics and Science Teacher Retraining Program is a part-time program to retrain current teachers for mathematics and science teaching at the junior or senior high school levels. (Current teachers include those on emergency credentials and those in nonshortage areas in grades K-12.) The program was initiated by the California Department of Education to address the severe shortage of qualified mathematics and science teachers in Los Angeles County. The two-year program consists of college courses and teaching workshops designed to help teachers define, understand, and apply effective mathematics and science teaching methods and strategies.

The Los Angeles County program is not modeled on any existing retraining program. Although the program design has evolved somewhat over its history, the goals of the program have remained unchanged. The severity of the shortage has continued: Although the program has qualified a large number of teachers, retirements and decreases in the rate of entry into the teaching profession in mathematics and science have offset this supply increase. The Los Angeles County Office has been approached by others interested in implementing a similar program; however, there has not been funding available to replicate it.

PROGRAM DESCRIPTION

Enrollment

The program was begun in 1982 with over 700 teachers expressing interest. Four hundred teachers applied and 170 were accepted into Cycle I of the program. Beginning with Cycle II, teachers interested in the program were instructed to contact their districts rather than apply directly to the program. Districts nominated the candidates judged most suitable for the program, thereby decreasing the applicant pool faced by program staff. Cycle II began in 1984 with 160 applicants, 134 acceptances, and 100 participants. The current cycle (Cycle III/IV) began in 1986. (Funding for the fourth cycle was approved while planning for Cycle III was still under way, so the two cycles were combined.)

Districts nominated over 260 teachers for Cycle III/IV. Program staff analyzed nominees' college transcripts and geographical locations; those with sufficient background in mathematics or science and located within commuting distance of a planned retraining site were accepted (127 in mathematics, 72 in science). Early dropouts totaled 35 in mathematics and 33 in science, leaving 131 participants in the current cycle: 92 in mathematics and 39 in science. Mainly for political reasons, state funding for an additional cycle was not approved, so Cycle III/IV is the last.[1]

[1]A few months after this interview, state funding for the Los Angeles County Office of Education's Teacher Education and Computer Center (TECC), under which this retraining program was operated, was

Each cycle has started at or near the maximum program size given budget constraints but has dropped below this size with attrition. Program classes are held in six different locations throughout Los Angeles County but are still far from many districts. Thus, travel considerations prevent many interested teachers from enrolling and also contribute to the attrition problem. Teachers work full-time while participating in this program. The combined demands of work, travel, homework, and family prove to be overwhelming for many participants, who leave the program temporarily or permanently.

The program currently consists of two science retraining sites (Cal State Long Beach and Glendale Community College) and four mathematics sites (El Camino Community College, Whittier College, and University of La Verne; classes in the La Verne program are given at two locations: Long Beach and in the San Fernando Valley). Graduates receive a Supplementary Authorization (equivalent to full certification) to teach mathematics or science at the junior high level (grades 7-9). Some districts allow teachers with this credential to teach junior high level courses (e.g., algebra, geometry) in high schools as well.

Program Requirements

With the exception of the Cal State Long Beach Program, the retraining program consists of five courses in mathematics (or science). Between 32 and 35 units are needed for the M.A. degree, so the retraining coursework will rarely be enough to supplement prior work and qualify the participant for a graduate degree. Graduates who have completed coursework through calculus may be able to pass the NTE in mathematics and qualify for a high school credential without additional mathematics coursework, but only a few have taken the NTE and passed. The Los Angeles County Office of Education offered a review course for the NTE and organized study groups for Cycle II graduates; about 18 participated.

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terminated. This funding cut was made for budgetary reasons; it does not reflect on the value or quality of the program, which was just one of numerous activities funded by TECC.

The five courses in the program are given consecutively, one per semester. Each cycle of the program has differed somewhat in the use of a summer course, so each cycle has lasted between 2 and 2-1/2 years. Most participants who complete the program do so on schedule, but a few (fewer than five per cycle) have dropped out of their initial cycle and started again at the same point in the next cycle. Reasons for this break have included personal problems and poor performance in one or more courses.

The coursework in the Cal State Long Beach Program is slightly different because it is organized around modules rather than classes. Neverthless, the program is similar to programs at the other sites in that the five academic-year semesters require a set of modules worth three or more units. The two summer semesters require one-unit modules.

Each site provides the same content courses needed for credentialing. These are equivalent to regular college courses in content but are open only to program participants. Classes are held twice per week in the late afternoon or evening. Most are taught by regular college faculty or lecturers. The program also includes a series of content delivery seminars developed and facilitated by specialists from the County Office of Education. These seminars cover such areas as vocabulary acquisition, concept, skill, language development, and problem solving. Tutors are provided at each site and district resource persons are available to assist participants with coursework. Since all participants are practicing teachers, there is no field placement. Specific courses in each program site are:

Cal State Long Beach:

(Modules for Fall Semester--four units)
- Processes of Science
- Mathematics for Science
- Atomic/Molecular Structure
- States of Matter

(Modules for Spring Semester--four units)
- Motion/Mechanics
- Meteorology
- Chemical Change
- Heat

(Module for Summer Semester--one unit)
Geologic Resources, Processes, and Structures

(Modules for Fall Semester--four units)
Oceanography
Sound
Electricity/Magnetism
Cells and Development

(Modules for Spring Semester--three units)
Animals
Plants
Acids, Bases, and Equilibrium

(Module for Summer--one unit)
Ecosystems

(Modules for Fall Semster--three units)
Genetics and Evolution
Light, Color, and Optics
Astronomy

Glendale:
Physical Science
Chemistry, with lab
Physics, and individual study in Mathematics
Biology
Astronomy

El Camino:
The Real Number System
College Algebra
Geometry
Pre-Calculus
Calculus

La Verne:
Introduction to Math and the Real Number System
College Algebra
Geometry
Pre-Calculus
Calculus

Whittier:
Real Numbers
College Algebra
Geometry
Pre-Calculus
Calculus

Some participants are able to claim exemption from one or more courses because of recent college coursework (within last seven years). The credential analyst who works with the program examines each participant's college transcripts to determine exemption eligibility.

Recruitment and Admissions

The Los Angeles County retraining program is directed at (a) mathematics and science teachers on emergency credentials, and (b) elementary teachers and junior high teachers from other fields who wish to retrain for mathematics or science teaching. The program has retained this dual focus since its inception. The program is particularly interested in enrolling teachers who are successful in the classroom (as judged by their principals), are committed to teaching, have at least some mathematics background, and are not nearing retirement.

Recruitment for Cycle I of the program involved announcements sent to every school in the county, word-of-mouth, and announcements in teacher newsletters. Teachers applied directly to the County Office of Education. Recruitment for Cycles II, III, and IV has proceeded somewhat differently. Each district now has a designated liaison (e.g., the assistant superintendent, a district personnel official) who publicizes the program to principals and teachers. Districts nominate interested teachers from lists provided by principals. All selections are made by the program director and staff at the Los Angeles County Office of Education.

The new recruitment strategy has proven more effective than the Cycle I strategy in identifying promising applicants and successfully enrolling them in the program. Although the large number of links in the recruitment process has caused some communication problems, program staff have generally been successful in identifying appropriate candidates and informing them about the program. The major recruitment difficulty stems from travel time considerations: Many qualified and interested teachers live too far from the six class locations.

Applicants are evaluated on their mathematics background, interest in the program, and geographical location. The program does not screen individuals using exams or other methods, preferring instead to enroll as many individuals as possible and providing the necessary support systems to help them complete the program successfully. A screening exam is administered upon entry into the program, but the results are

not available until midway through the first course. At that time, the instructor and site coordinator meet with each participant to discuss the participant's initial performance and program experience. Participants who seem likely to run into subsequent difficulties are counseled to seek additional help from tutors or they themselves decide to drop out.

Participants

Approximately one-third of the participants are male. Participants range in age from 22 to over 50. In the most recent cycle, approximately 10 percent are under 30 years of age, 50 percent between 30 and 40, 35 percent between 40 and 50, and 5 percent are over 50 years old. Approximately 50 percent are white, 10 percent black, 20 percent Hispanic, and 20 percent Asian. These statistics have remained relatively constant over the four program cycles. Participants are teachers at the elementary, junior, and senior high levels; some are currently teaching mathematics or science classes with emergency credentials. Most participants have B.A. degrees; a few hold an M.A. degree as well.

Program Graduates

Approximately 69 participants completed Cycle I. Sixty-two graduated from Cycle II--49 in math and 13 in science. Although most of the attrition occurs during the first course, participants continue to drop out in subsequent courses for a variety of reasons. Participants with college mathematics backgrounds are less likely to have problems with the more advanced mathematics courses. Participants who live near their retraining site are less likely to drop out. According to program administrators, participants' "tenacity" is a major factor in successful completion: The program involves a significant, extended time commitment.

Data are not available on the number of teachers switching into mathematics or science teaching following program completion. Teachers on emergency credentials generally continue in the same classes they taught before (and during) the program. Very few teachers switch

districts, since they would lose seniority and other benefits. Most of the participants are from urban districts--primarily Los Angeles Unified School District.

The program director is not aware of any unusual problems faced by retrainees and believes that those who wish to switch into mathematics or science will probably not face significant barriers. Graduates were followed up for state-mandated evaluations of Cycles I and II, but detailed information on their experiences after completing the program was not obtained. Outside of these evaluations, the program director and site coordinators have not maintained formal contact with graduates.

Affiliation and Funding

The Los Angeles County MSTRP is fully funded by the California State Department of Education. Cycle I was funded as the Mathematics Teacher Retraining Program through the State Budget Act of 1982. Funding for Cycles II and III/IV was provided under SB813.

The Los Angeles County Office of Education subcontracts with the five participating colleges to provide coursework. The total cost of Cycle II was $500,000 (111 initial participants, 62 graduates). Cycle III is budgeted at $509,000 (88 initial participants) and Cycle IV at $510,000 (88 initial participants). Participants do not pay tuition or textbook costs for required courses and seminars. Participants may elect to pay for optional coursework in teaching methods, however.

FUTURE PLANS

Program assessments have been used in modifying and improving the program, and for reporting to the state on the county's use of program funds. Ms. Calderon sees the extensive support system in the program as its primary strength. This support system includes tutoring, on-site coordinators, credential analysts, site planning teams, and extensive monitoring by county staff. Another strength is the use of program-specific courses rather than having participants enroll in courses with regular college students. Ms. Calderon views the instruction as both a strength and weakness--it depends on the individual instructor. Some of the instructors are not well-suited to teaching adults who are also teachers.

Dr. Glienna views the instruction as a major strength of the program. The courses at Glendale are taught by the best instructors on campus and are regular, well-developed science courses from the Glendale curriculum. The tutor (a secondary science teacher) is also a significant strength of the program. Dr. Glienna would like to see the participants released from nonteaching activities at their teaching jobs, and would also like to see them better prepared for college-level science courses.

Dr. Smith views the major strength of the program to be the contact between teachers and mathematics faculty. He believes the major weaknesses to be the large amount of work involved for the teachers and their travel time. He would like to add more work with computers to the course sequence, perhaps as an elective.

Dr. Ritz believes that the major strength of the Cal State Long Beach program is that the teachers receive hands-on experience. The use of experienced teachers for part of the instruction and the modular nature of the Long Beach program are also considered strengths. He sees no real weaknesses with the program, but believes that the modular approach could result in fragmentation unless one is careful to guard against it. He believes that they have adequately guarded against fragmentation by providing for review and integration of previous modules.

Ms. Kasabian would like to see an optional beginning Algebra course added to the program for participants who require remedial work. Dr. McGuire views the quality of instruction as a major strength of the program, along with the support structure, particularly tutoring. He would like to provide additional support, but since classes in the La Verne program are given at remote locations, he is not able to do so. He sees some problems in the complexity of responsibilities across different components of the program--the state, county, site, and instructional location. Infrequent problems have arisen because of misunderstandings over the division of authority and responsibility among the various groups.

Ms. Calderon views the geography of Los Angeles as a major problem. If sufficient participants were available in smaller areas, or satellite technology could be used for delivering instruction, she would like to form separate ability groups and offer courses more closely geared to participants' needs. Since continued funding for the program is unavailable, these plans may not be implemented.

Case Study 9

TEXAS WOMAN'S UNIVERSITY: THA-MASTER[1] PROGRAM AND ELEMENTARY AND SECONDARY MATHEMATICS TEACHER PREPARATION PROGRAM

Interviewers: Neil B. Carey
Sheila Nataraj Kirby

Contact Person: Rose Marie Smith
Texas Woman's University
Denton, Texas

The Texas Woman's University (TWU) programs were designed to retrain teachers from other disciplines or grade levels to become secondary school teachers of mathematics. The THA-MASTER program was initiated by Dr. Smith, who responded to a questionnaire from Madeleine Long, the THA-MASTER program director, asking if TWU would like to participate in the program. This program was modeled after one that was first implemented at Long Island University and was also implemented at several other institutions across the country. The program at TWU was started because of shortages of mathematics teachers in the Denton and Dallas-Ft. Worth areas. Those areas had always suffered from teacher shortages, but in recent years the problem has become more acute.

The THA-MASTER program ran for 14 months, from Summer 1985 to Summer 1986, at which time its FIPSE funding cycle was completed. Because the program is directed toward currently practicing teachers, it is part-time during the school year but full-time in the summer. Participants take two courses in the summer and one course per semester during the academic year.

The Elementary and Secondary Mathematics Teachers Preparation program was begun by Dr. Smith in the Spring of 1986 and is still operating. It was funded originally by Title II monies provided by the Coordinating Board of the State of Texas. It is very similar to the THA-MASTER program in that participants attend part-time during the

[1]THA-MASTER stands for The Hellman Academy for Mathematics and Science Teacher Education Retraining.

school year and full-time in the summer. One major difference is that THA-MASTER participants formed a cohort, whereas participants in this program proceed individually. Because TWU is an eminent university for women, most participants are women.

PROGRAM DESCRIPTION

Enrollment

The THA-MASTER program began in Summer 1985. Newspaper advertisements were used in which those interested could mail in an application. Approximately 70 applications were received. Of those, about 20 were already certified in mathematics--they were encouraged to apply to other programs at TWU. The advertisements were effective recruiting tools. Twenty applicants were accepted and all 20 participated. Six people were added, but three dropped out during the course of the program, so the program had 23 graduates.

The Elementary and Secondary program started in Spring 1986 with 40 participants, of whom 20 were applying for elementary certification (in mathematics) and 20 for secondary certification. The program received twice as many applications as positions. The newer Fall and Spring classes have also tended to be equally divided between those seeking elementary and secondary credentials. Again, those applying with substantial background in mathematics are encouraged to apply to the Master of Science in Science Education (MSSE) program. Newer classes have had between 24-44 participants.

Program Requirements

Participants must complete a total of 18 semester credit hours in mathematics to obtain an elementary credential (grades K-8) to teach mathematics. Those seeking a secondary credential (grades 7-12) must have 24 semester hours in mathematics. It was assumed that THA-MASTER participants would begin the program with six semester hours on their transcript, so the 18 units often fulfilled the requirements for a secondary mathematics credential. The mathematics courses offered to fulfill this requirement were: Survey of Mathematics I; Survey of Mathematics II; Applied Calculus; Applied Calculus II; Survey of Modern

Mathematics; and History of Mathematics. A course in modern geometry and statistical methods completed the offerings (21 out of 24 needed credits offered).

If participants did not have the full six units coming into the program, the courses offered were usually three units short of that needed to obtain certification, so many participants continued their studies in the Fall of 1986. A few were finishing their credentials in Spring 1987. The program is also considered the beginning of courses applicable to qualify for the Master of Science or MSSE degree. There is no field experience required as part of the program, since all participants have been or are currently teachers.

The Elementary/Secondary program, like the THA-MASTER program, offers evening mathematics courses during the academic year and summer day-time courses. There are two summer sessions. In addition to the standard mathematics courses, seminar courses on current issues in mathematics education, particularly geared toward problem solving, are offered in all sessions. By the end of the summer, elementary certification participants in the Spring 1986 class (the first group) had nine out of the needed 18 credits. Secondary certification participants had earned 15 out of the needed 24 credits. This group then continued in the Fall and Spring; about 80 percent received their credentials by Summer 1987. For the first class, tutoring was available from a graduate teaching assistant. One school district provided its teachers with extra tutoring. Dr. Smith felt that this assistance played an important role in helping participants stay in the program.

Recruitment and Admissions

The two programs are mainly directed toward current teachers from other fields who wish to obtain credentials in mathematics; however, often persons respond because of latent interest in mathematics, a desire for job security, or because they had already been placed into mathematics positions and wished to obtain the appropriate credential. Program recruitment involved newspaper advertisements, notifications to professional organizations, news articles, and information mailed to area schools. The newspaper ads and articles are particularly

successful recruitment tools. It has not been difficult to attract qualified candidates.

The criteria for selection are:

- An undergraduate degree from an accredited institution;
- An undergraduate GPA acceptable for admission to the graduate program at TWU (3.0 assures unequivocal acceptance, 2.75 allows provisional acceptance);
- No more than six hours of undergraduate mathematics;
- Teaching experience; and
- An expressed desire to teach mathematics and to stay in Texas.

Desire to teach as expressed in the interview is considered the single most important criterion determining the applicant's fitness for the program. Also helpful are having had some undergraduate mathematics coursework and a reasonable degree of success in the early mathematics courses.

Participants

None of the THA-MASTER participants were minorities. Participants tended to be between the ages of 25 and 30. All participants were teachers with B.A. degrees; none had advanced degrees or certification in mathematics. All but three participants continued through the second summer of the program. Because six participants were added to the program in the second course, 23 people graduated from the program. All three of the unsuccessful participants had weak mathematics backgrounds and high mathematics anxiety. All three are continuing to work on certification in mathematics at a slower pace. The Elementary and Secondary program has a similar range of participants. Most are in their thirties and have been out of college for a while; the age range is between 25-45.

Graduates

All of the programs' graduates had job opportunities, but no comprehensive data are kept on graduates' current positions. Some TWU mathematics graduates reported offers from as many as six schools. Graduates have gone to rural schools about 35 percent of the time, to large urban schools 50 percent of the time, and to urban areas of Dallas-Ft. Worth about 15 percent of the time. None of the graduates are known to have experienced difficulty obtaining a teaching position. No formal follow-up of graduates has been done or is planned, but program administrators report that informal contacts in the schools suggest that, in general, the teachers produced by these programs have been outstanding. Several have subsequently enrolled in the MSSE program.

Affiliation and Funding

The programs are run by TWU's Department of Mathematics, Computer Science, and Physics. In the first year of the THA-MASTER program, $15,100 was received from FIPSE, which was used for advertising, graduate assistants, and supplies. None of the money went to student aid. Program tuition was $154 per three-hour course. Assuming a participant entered with three semester hours in mathematics, 21 units more would be needed to obtain a secondary credential, for a total cost of $1,078. Dr. Smith noted that the relative lack of financial support available for part-time participants was sometimes a deterrent to entering the program. One participating district contributed toward the tuition and fees of teachers who participated in the program. The FIPSE money was important because it allowed TWU to keep the THA-MASTER program together as an entity: Participants "got to know one another" and were able to support each other. The program was limited to 20 because of a desire to maintain personal contact with participants.

The Elementary and Secondary program was started with $60,000 in Title II monies. Participants received a stipend of $250 in Spring 1986 and $250 in Summer 1986. The Texas Legislature appropriated $100,000 over a two-year period ending August 1987 to encourage current and

prospective teachers. Dr. Smith used this money to provide tuition support for some of the participants, to encourage teachers to return to school in other programs, and to encourage undergraduates to obtain teaching credentials. It was felt that the stipend received by the first group was an important inducement to candidates to apply to and continue in the program.

FUTURE PLANS

TWU continues to train mathematics teachers in the Elementary and Secondary program. The university intends to follow up program graduates in Fall 1987. So far, evaluation has been limited to informal consideration of the strengths and weaknesses of the project. In a related future program, starting in the summer of 1988, TWU will be involved in an NSF-sponsored satellite program, which uses mentor teachers as a resource.

The THA-MASTER program's special strength has been its ability to produce a group of competent mathematics teachers and train them as a cohort. As mentioned above, Dr. Smith feels that retraining teachers as a cohort is an important advantage, since it encourages participants to support each other. The Elementary and Secondary program continues to train teachers, although Dr. Smith is looking for funding to help support participants. Texas is providing higher pay as a career incentive for teachers to return to school. This might have an impact on the program.

Case Study 10

UNIVERSITY OF WEST FLORIDA: MATH-SCIENCE TEACHER EDUCATION PROGRAM

Interviewer: Sheila Nataraj Kirby

Contact Persons: William Halpern
Coordinator of Math-Science
Teacher Education
Patricia Wentz
Interim Dean
College of Education
University of West Virginia
Pensacola, Florida

This program began at the request of the Navy. At the urging of Governor Bob Graham, Vice Admiral J. A. Sagerholm, Chief of the Naval Education and Training Command at Pensacola Naval Air Station, embarked on a pilot program to upgrade science and mathematics programs in public schools by recruiting skilled volunteers. The Naval Air Station then encouraged the University of West Florida to set up a program to allow interested persons to obtain teaching certification through special classes held on the base. Although the program originally was conceived as a second-career option for Navy retirees, several younger people have also recently become interested.

The initial goal of the program, from the university's point of view, was to increase the number of mathematics and science teachers by building on participants' content knowledge base and providing the necessary courses for teacher certification. At the Air Force's request, they are now starting a similar program for Air Force personnel. The program is not modeled on any other existing programs.

Florida appears to have teacher shortages in all teaching fields. The state hires more than 7,500 new teachers each year, most (75-80 percent) from out of state. Shortages are particularly severe in mathematics, science, English, foreign languages, and special education. Dr. Halpern feels that the program has been extremely useful in attracting individuals with expertise and a fresh perspective, thus

raising the quality of mathematics and science education in the area. Unfortunately, those teachers wishing to remain in Pensacola are having some difficulty locating jobs. Although they can and do find positions, they usually have to compromise--e.g., take a junior high school position until a high school position opens up, or a general science class until a physics opening emerges. However, graduates willing to move to other areas in Florida have no trouble locating positions.

PROGRAM DESCRIPTION

Enrollment

The program began in the Fall of 1983. There were approximately 60 applicants during the first year of the program, all of whom were accepted. Between 15-20 actually participated. The program is very loosely structured, so there is no set time for individuals to start the program. As a result, enrollment data by year are not available. Currently the program has approximately 30 active participants in different phases of the program, with perhaps 15-20 entering each year. Interest appears to be growing, although enrollment is in direct proportion to personal contact. (Dr. Halpern goes to the bases and schedules half-hour interviews with interested personnel.) There is no limit to the size of the program, but since Dr. Halpern has been too busy to visit bases on a regular basis, this has in effect acted to limit enrollment.

There are two routes to certification in Florida: through a state-approved teacher education program which allows one to teach not only in Florida but, through reciprocity agreements, in 31 other states;[1] and through "course counting" for individuals with a bachelor's degree who take certain prescribed courses for specific certification areas. The latter guarantees certifiability only in Florida. Participants can choose either route; those who are sure they will remain in Florida (most do) and who want to get through more quickly usually opt for the "course counting" route. Participants can also receive certification in more than one area.

[1]There can be a three- to five-month waiting period for the state-approved certification.

Currently, four to five participants are working toward certification in mathematics, three to four in general science, four in biology, three in chemistry, and three to four in physics, with some overlap. Participants prepare to teach grade levels 7-12 and are eligible for full certification on completion of all requirements. The length of the program varies a great deal, depending on participants' background. It typically takes two to four semesters. Almost all participants attend part-time.

Program Requirements

Program requirements are as follows:

- Psychological foundations of learning/teaching.
- Sociological foundations of curriculum/instruction.
- Instructional design, classroom management, and reading in the content area for middle/junior high school.
- Special methods in science or mathematics (along with a lab course).
- Student teaching.

The student teaching requirement usually consists of 10 weeks of full-time student teaching. However, a participant is allowed to substitute up to six weeks of prior teaching experience (for example, as a Navy instructor) provided this is well-documented in terms of time and teaching quality. The placement is technically done by the county, although both the university and the participant have some say in the process. There is an informal, friendly relationship between the program and the neighboring school districts. The student teacher is under the direction of the classroom teacher and, over the course of the 10 weeks, progressively assumes more instructional responsibility. The university coordinator usually visits the classroom four times during this period, to evaluate and provide feedback. Supervising teachers are not paid but receive a certificate of participation that entitles them to one semester of free tuition in any Florida state university. Only

about 20 percent of teachers use this benefit, using it primarily for recertification purposes (many of them already have a master's degree).

In addition, there are a number of required courses in each specific content area. Most participants would have completed such courses or their equivalent already. The program is extremely flexible regarding content-area course requirements, allowing substitutions and transfers whenever possible. (A guide published by the American Council on Education is used to determine college course equivalents for service schools.)

Recruitment and Admissions

The program is directed toward military personnel who are within two years of retirement. Although it first included only Navy personnel, Air Force personnel are now being included as well. Recruitment is mainly through personal visits to local military bases, although interest has been generated through announcements sent to base education officers and articles in newspapers. The personal approach appears to be the most successful. Program managers have had no trouble locating qualified candidates--in fact, they have received a number of calls from out-of-state people interested in joining the program. (Because this program is designed to serve only those in the nearby area, they have encouraged these out-of-state individuals to check available options at their own local universities.)

Military retirees are also in high demand in other industries in the Florida area. Civilian contract service and middle management positions are especially available and enticing. Applicants who choose not to enter the program, participants who drop out of the program, and graduates who do not enter teaching usually take one of these other job opportunities instead. Many people who initially apply for the program do so as one of many options they explore for post-retirement careers--for some, it is just something to fall back on if all else fails. (Dr. Halpern mentioned that many military people who first inquire about teaching are immediately turned off when they find out what a teacher's salary is--but others are convinced that this is what they want to do, in spite of the low pay.)

Admissions criteria vary depending on whether the individual seeks admission to the program or takes program courses as a nonmatriculating student. The requirements for admission to the Teacher Education Program are:

- A GPA of 2.0 in all courses taken at the university with a 2.5 GPA in each of the science/mathematics fields chosen;
- A score of 835 or higher on the SAT or a score of 17 or higher on the ACT;
- Demonstrated proficiency in written and spoken English use, reading, mathematics, fundamental computer concepts and skills, and completion of noncredit educational media, computer, and metric laboratories;
- Recommendation of the student's advisor; and
- Approval by the Dean of the College of Education.

Candidates not wishing to go through the formal admission process may register as "special" (nonmatriculating) students (although they are subject to the same academic standards and review procedures); course work completed while in the special student category may then be used to complete certification requirements. (Special students must seek certification--through the course-counting option--on their own.)

An important part of the recruitment and admissions process is the on-base personal interview conducted by Dr. Halpern. This allows him to better assess the applicant's qualifications and desire to teach. Participants' suitability for teaching is also determined by evaluation of their experience in service-related volunteer programs, as well as during student teaching.

Participants

Of the currently active participants, approximately 90 percent are male, and about 75 percent are white, with the remaining being divided among black (10 percent), Hispanic (8 percent), and other ethnic groups. Participants range in age from the early 30s to late 40s, with most

being over 40 years old. Both Dr. Halpern and Dr. Wentz rated the participants (most of whom are fairly high-ranking Naval officers) very highly in terms of motivation and discipline; however, participants' paper qualifications (GPA) are sometimes not as good as they would like (mainly because in most cases, the undergraduate degree was completed 20 years ago). Many participants have bachelor's degrees in one of the sciences or mathematics; almost half have master's degrees as well.

Program Graduates

Approximately 15-16 participants have completed the program since it began. About five or six have gone into teaching. (As noted above, many choose other career options.) Graduates tend to seek positions in districts where they did their student teaching and in both public and private schools. Both Dr. Halpern and Dr. Wentz stressed that in Florida, military trained people are regarded as an asset; the area has a strong military heritage, and retired military personnel have traditionally constituted 10-15 percent of the teacher work force, particularly in business/military and political science subject areas.

Those most successful in completing the program are individuals with past experience with children--such as working with Boy or Girl Scouts, or teaching Sunday school. When participants drop out, they usually do so fairly early on (during the first two courses). Dr. Halpern gave three reasons for dropping out. In order of importance, these are: (1) finding out--and not liking--what schools are actually like (the program strongly encourages participants to do volunteer work in the schools before beginning their student teaching, so these decisions and adjustments can be made early); (2) getting a better job offer; and (3) deciding, as they learn more about teaching, that this really is not what they want to do.

The program does not follow program graduates, although program staff receive some informal feedback.

Affiliation and Funding

The program is state-approved and under the aegis of a governance group drawn from both the College of Education and the College of Arts and Sciences. There is no separate budget for the program, although the university administration strongly supports it.

All participants are eligible for Veterans Administration benefits or tuition reimbursement from the Navy or Air Force. Current fees are approximately $33 per credit hour. Thus, a typical program consisting of 20-26 credit hours would cost between $660 and $825.

FUTURE PLANS

The program is subject to an ongoing informal assessment about every two to three months, but may have a formal assessment at some point. Lack of resources was cited as the single biggest weakness of the program. Program staff felt that if they could receive support for two more positions, they could accommodate an enrollment of between 50-75 people per year. There is a great need for someone to help with recruitment, which takes up an inordinate amount of time. The inflexibility of state certification requirements was also mentioned as a barrier to increasing the number of participants; the recent raising of the GPA requirement to 2.5 was regarded as particularly short-sighted, given the severe teacher shortages in Florida.

The strengths of the program include its flexibility, which allows the program to certify many types of military retirees in different ways, and their efforts to tailor the program to their participant pool, by bringing the program to participants (they can take courses on-base after work) and by the careful selection of course instructors who can best help these participants "loosen up" in the classroom (i.e., not treat students like military recruits). Flexibility was also seen as a disadvantage, however, in that military people tend to prefer more organization. They do have plans for adding more structure, although it is not yet clear exactly how this will done.